# REPORT ON THE OPERATIONS

OF THE

# DEPT. OF LAND RECORDS AND AGRICULTURE,

## NORTH-WESTERN PROVINCES AND OUDH,

FOR THE YEAR ENDING 30TH SEPTEMBER 1891.

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1888-89 & 1904-05

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## For the year ending 30th September, 1889.

No. 1920 OF 1889.

FROM

T. W. HOLDERNESS, ESQ., *C.S.*,

DIR., DEPT. OF LAND RECORDS AND AGRICULTURE,

N.-W. PROVINCES AND OUDH,

To

THE CHIEF SECRETARY TO GOVERNMENT,

N.-W. PROVINCES AND OUDH.

*Dated Cawnpore, the 23rd December, 1889.*

SIR,

I HAVE the honour to submit, for the orders of His Honor the Lieutenant-Governor and Chief Commissioner, the annual report on the work of this Department for the year 1888-89.

### SECTION I.

#### MAINTENANCE OF VILLAGE RECORDS.

2. Under instructions from Government this section of the report is submitted separately to the Board of Revenue and to the Oudh Revenue Department for the provinces of the North-Western Provinces and Oudh respectively, and is embodied in the Revenue Administration Report for the year.

### SECTION II.

#### ANALYSIS OF DISTRICTS.

3. In continuation of the series of statistical maps appended to the report for last year, a further series is now given showing the distribution of maize, peas, smaller millets *(mandwa, kodon)*, linseed and rapeseed in the several districts of the North-Western Provinces and Oudh. The maps of maize, peas and smaller millets are based on the average of ten years in the temporarily-settled districts of the North-Western Provinces, and of five years in the permanently-settled districts of the North-Western Provinces and the districts of Oudh, earlier figures for the latter being not available. Maps of linseed and rapeseed are constructed on the average of two years (1885-86 and 1886-87), when special returns in connection with the forecasts for these crops were obtained from patwáris as to the extent which these important staples are cultivated both as a sole crop and also as mixed with other winter crops; the area which they would

have occupied had they been cultivated as sole crops being subsequently worked out in this office by formula adopted after consulting the principal agricultural correspondents of the Department.

It is perhaps not improper to mention in this place that the statistical analysis of districts by means of the series of registers known as the mahál and mauza register and the pargana books is steadily proceeding. Every year the most important facts as to crop area, the rental, the growth of tenant right, the ease or difficulty with which the land revenue is collected, are abstracted for each village in a statistical form from the patwári annual papers and ledgered in the mahál and mauza registers. This information is exhibited in a more condensed form in the pargana book, and District Officers are required to constantly examine the entries in the latter and to inquire into, and record the explanation of, any abnormal variation in the figures of the year. The pargana book was meant to give in time a good idea of the economic condition of every estate in a district. But as yet this object has not been fully obtained. The examination of the pargana book in many districts has not been systematically undertaken: and it is alleged that the entries often cannot be relied on, and that even when they have been correctly excerpted from the patwári's papers they fail to reveal the strength or weakness of particular estates. That they do afford *some* information is not denied, and the more the entries are examined and arithmetical errors exposed, the more care will be taken by the registrar kánúngos in their compilation. Want of time and the pressure of more urgent duties no doubt stand in the way of a full observance of the rules regarding the maintenance of the pargana book, but I think the rules might be complied with somewhat more than they are at present.

## SECTION III.

### System of collection of Revenue and Rental in precarious tracts.

*Nil.*

## SECTION IV.

### Measures of Protection, including Arboriculture.

**4. Reclamation of waste lands, Jhansi.**—It was stated in last year's report that on the suggestion of Mr. G. Ward, C.S., the late Commissioner of Jhánsi, the Government undertook a series of experiments in the Jhánsi district with the object of ascertaining whether by means of embankments the denudation of this hilly country could be checked and fertilizing deposits of silt formed. A few small works of this kind were made in the immediate neighbourhood of the station of Jhánsi, and a larger work, consisting of a masonry bund, thrown across a break in the hills at a point called Kalapahári. But the more important project is a series of thirty bunds at Raksha. Regarding these the Executive Engineer has reported as follows:—

"The construction of the Raksha bunds was begun in August, 1888, but very little work was done during the rains. During the cold weather of 1888-89 the bunds made rapid progress, and by March, 1889, out of the 30 contemplated, 19 were completed, Nos. 1 to 17, 10A and 27, at a cost of Rs. 7,682.

"Since March last a further sum of about Rs. 1,400 has been spent on the maintenance of the embankment. Waste weirs were built at Nos. 1, 5 and 9; the water slopes of Nos. 1, 3, 5 and 9 were pitched with stone. The new earthwork of the bunds was brought to its original level wherever sinkage had taken place, and the dry slopes were sown with *babúl*. No breach or failure occurred, and owing to the somewhat deficient rainfall of the past season the bunds have had the opportunity of consolidating before being exposed to heavy pressure. Owing to the abovementioned deficient rainfall all the tanks did not fill. Those behind bunds Nos. 2, 7, 8, 12, 13 and 14 were only partially filled, and since the end of the rains those at Nos. 4, 10, 10A, 11 and 15 have dried up. No water has been taken from these tanks this season for irrigation, nor have the beds of those that have dried up been cultivated."

An officer of the Irrigation Department has recently made a special inquiry into the value of these works, but his report has not yet reached this Department. I have yet not had an opportunity of seeing them myself.

5. **Reclamation of Usar land.**—An appendix to this report gives full details of each of the several plots of usar land which are under observation and experimental treatment, either by this Department or by the Irrigation Department. The six plots under the Irrigation Department adjoin canal distributaries in the Aligarh and Etáwáh districts, and the experiments undertaken on them have for their object the ascertainment of the effect which enclosure, the planting of trees, and the use of silt and canal water have on the salt-impregnated soil. The three plots in the Aligarh district are worked as plantations, one of them having been 15 years under culture, the second eight years, and the third five years. The result cannot be considered satisfactory. The land bears a fair crop of grass and trees thrive to a certain age, but a blight, probably due to the roots reaching a substratum of *kankar* (nodulated limestone), strikes them before they reach maturity. The three plots in the Etáwah district are attempted to be worked as arable land by means of depositing silt from the canal on their surface and sluicing them, after embankment, with canal water. Two of the plots may now be considered to have been fairly well reclaimed, the larger of the two having been let at a low rent for five years to a good tenant: and the third, which has only been two years under treatment, is progressing favourably. The weak point in all these experiments is their financial result. In no case can it, I think, be said that the capitalized value of the improved land covers the expenditure which has been incurred. I am afraid the same verdict must be passed on most, if not all, of the plots in the Cawnpore and Aligarh districts under the management of this Department, which I will next notice. These plots are (1) the Juhi, the Amramau and the Narayanpur plots in the Cawnpore district, and (2) the Gursikran and Cherat plots in the Aligarh district.

The Juhi plot, a large enclosure of 102 acres, has been under observation and experiment for seven years. The method adopted and the present character of the herbage and plantations as ascertained by Mr. Duthie in November last, are detailed in the appendix. Here I need only say that the grasses have distinctly improved and that some success has been obtained in planting *babúl* and other hardy trees. But the process is very slow, and it is questionable whether, even if a good fuel and fodder reserve be ultimately established, the revenue resulting from it will yield a fair interest on the capital. This after all is the question of primary interest. That usar land, save in its very worst form as a saline deposit often resting on a bed of *kankar*, is capable of reclamation is a fact known to intelligent native agriculturists. Water, manure and fresh soil, ploughing and sowing of rice followed by gram and peas, will eventually convert most unpromising land into moderately fertile fields. This process of reclamation is seen at work under the stimulus of a dense population in southern Oudh and the great *usar* plains of the Doáb. But it is always a question whether the reclamation of a particular plot will pay. To prove that by ten or twenty years' enclosure—in itself an expensive process—accompanied by continuous planting and watering of trees and grasses, an indifferent fuel and fodder reserve can be produced is not a valuable economical fact. It will not encourage imitation where private means and not the public purse are concerned. The method followed on the second *usar* plot—at Amramau—in the Cawnpore district, attempts a more practical solution of the question. The 52 acres comprised in this block were first enclosed for two or three years with the object of encouraging the growth of vegetation and the formation of a fertile overcovering of *humus*. A cattle station was then formed on it in order to obtain manure, the cattle partly paying their way by the sale proceeds of milk. Fields were marked out, and embanked in order to hold up several inches of water in the rains. On the ground being sufficiently softened, or in native parlance "swelling," it was ploughed up, manured and sown with rice. If the rice took, a winter crop followed. The field might then be regarded as reclaimed and could be let to a tenant. In Amramau over half the area is now held

by tenants paying a rent of Rs. 16½, and it is hoped that in the next rains tenants will be found for most of the remaining area. In that case the 52 acres of what was once unpromising *usar* acquired by Government for Re. 1 per acre will represent a farm of some value and could be sold for a good price. From a rough valuation I made after local inquiry, I believe that the cost of reclamation from first to last can thus be cleared. If expectations as to settling the rest of the land with tenants are realized, I propose, with the permission of Government, to dispose of the land, as the object of the experiment will have been fulfilled. The zamíndárs of the neighbourhood are said to be imitating this method of reclamation on their own patches of *usar*. To the Assistant Director, Mir Muhammad Hussein, is entirely due the credit of this experiment.

The third plot of land in the Cawnpore district consists of 10 acres of *usar* which a year ago the Cawnpore Municipality made over to the Department for experimental trenching with nightsoil, canal water being also available. The result has been good: nearly the whole area is now let out to cultivators at the high rent of Rs. 16 the acre, and still higher rents may be expected if the canal distributary is not closed.

In the Aligarh district the two large blocks of *usar* under this Department at Cherat (242 acres) and Gursikran (718 acres) were acquired in 1885 and are being worked as fuel and fodder reserves much on the same lines as the Juhi block in Cawnpore, and with much the same results as regards the gradual improvement of the grasses and the progress of the planted trees. The exception to this statement is that half the Cherat block has recently been divided off, and a commencement made to reclaim it in the form of arable land by the methods adopted at Amramau. Careful accounts are being kept, as both the Assistant Director and I recognise that the most important aspect of the experiment is the financial. I have the satisfaction of knowing that the Director of the Northern India Botanical Department considers that the Amramau method is entirely on the right lines. "The planting of trees and shrubs," he writes, "should, I think, be undertaken only for ascertaining what kinds are likely to establish themselves, and in this way help to clothe the ground and *prepare it for cultivation.*" The italics are my own. The words bring out the underlying identity in object of experiments which at first sight seem to proceed on two different lines. Mr. Duthie adds that "for this reason I have recommended the sowing of *jait* seed (Sesbania Ægyptiacia) which I have noticed as thriving on bad usar, and it is very quick growing. If the seed is sown indiscriminately during the rainy season, there should be no extra expense regarding the plants, as neither transplanting nor watering will be required."

6. **Boring apparatus for well sinking.**—Apprentices were employed in six districts in the province and took a number of borings. The Department also lends boring tools to native gentlemen and others on favourable conditions, and some of the more enterprising landlords have had employés of their own trained to use the implements.

ARBORICULTURE.

7. **Receipts and Expenditure.**—The total expenditure during the year amounted to Rs. 66,989, which is Rs. 3,962 less than that of the previous year, the decrease being mostly in Bulandshahr, Aligarh and Bánda. Nearly 79 per cent. of the expenditure was incurred on avenues, 18 per cent. on groves and nurseries, and 3 per cent. on lopping and felling. The total receipts amounted to Rs. 47,084 against Rs. 32,890 in the previous year. The increase occurred mostly in Saháranpur, Muzaffarnagar, Bulandshahr, Bijnor, Moradabad, Bareilly and Sháhajhánpur, and was due to judicious pruning and felling of old or decaying trees, as well as to larger sales of fruit. In addition to the districts of Muzaffarnagar, Meerut, Bijnor, Pilibhít, Jaunpur, Benares, Unao, and Fyzabad noticed in last year's report the districts of Saháranpur, Bulandshahr, Moradabad, Cawnpore and Partábgarh this year realised an income which more than covered their expenditure. In districts south of the Jumna the net expenditure was again very high on account of the heavy cost of maintenance and the small return from

sales of wood or fruit. The following table shows the expenditure and receipts of each division during the year. Similar figures for every district are given in Appendix B.

| Division. | *Expenditure.* | | | | *Receipts.* | | |
|---|---|---|---|---|---|---|---|
| | Avenue. | Groves and nurseries. | Lopping and felling. | Total. | Lopping and felling. | Fruits, grass, &c. | Total. |
| | Rs. | Rs. | Rs. | Rs. | Rs. | Rs. | Rs. |
| Meerut ... | 9,429 | 1,934 | 89 | 11,452 | 14,906 | 612 | 15,518 |
| Rohilkhand ... | 6,866 | 971 | 280 | 8,117 | 6,354 | 3,772 | 10,126 |
| Agra ... | 8,347 | 1,879 | 678 | 10,904 | 3,545 | 1,046 | 4,591 |
| Allahabad ... | 8,139 | 2,629 | 452 | 11,220 | 5,871 | 1,538 | 7,409 |
| Benares .. | 4,576 | 1,051 | 251 | 5,878 | 1,707 | 1,800 | 3,507 |
| Jhánsi ... | 7,967 | 808 | 22 | 8,797 | 238 | 573 | 811 |
| Kumaun ... | 200 | 648 | ... | 848 | ... | ... | ... |
| Lucknow ... | 1,575 | 1,248 | 45 | 2,868 | 1,213 | 721 | 1,934 |
| Sitapur ... | 1,880 | 460 | 25 | 2,365 | 422 | 25 | 447 |
| Fyzabad ... | 2,054 | 232 | ... | 2,286 | 1,108 | 136 | 1,244 |
| Rae Bareli ... | 1,975 | 248 | 31 | 2,254 | 931 | 463 | 1,394 |
| Total Rs. ... | 53,008 | 12,108 | 1,873 | 66,989 | 36,295 | 10,686 | 47,084 |
| Transferred from Public Works Department. | ... | ... | ... | ... | ... | 103 | |

8. There is little doubt that if more general attention were paid by District Boards to this source of revenue, it might be considerably increased. I would venture to submit for the consideration of Government that the interest of the Boards might be quickened if they were allowed to retain any revenue they make under this head. I endeavour to give some effect to the principle that expenditure should bear relation to receipts in the apportionment of the district grants, while keeping the provincial total within the recognised limit. But this does not fully meet the case of districts like Meerut and Muzaffarnagar, in which the receipts exceed the expenditure and the existing grant is already probably sufficient. In such districts what the Boards would like is the right to utilize increased receipts in other ways.

9. During the year under report the total length of roads under operation was 3,570 miles against 3,310 in the preceding year. The largest additions were in Bulandshahr, Maínpuri, Moradabad, Fatehpur, Allahabad, Jaunpur, Gorakhpur, Jhánsi, Bara Banki and Gonda. The following table shows the total length of avenues at the close of the year in each division and the length which were under operation during the year under report. Zamíndárs and other private individuals in the districts of Meerut, Etawáh, Cawnpore, Sháhjahánpur, Fatehpur, Allahabad, Jalaun, Unao and Kheri are reported to have taken considerable interest in planting and maintaining avenues along the public roads. The co-operation of local landowners can often be secured by conceding to them the right to the fruit, the loppings, and the dead wood on a road made over to them for planting. But in such cases supervision on the part of the District Officer cannot be wholly dispensed with. He should see that a suitable class of tree is planted; that the plants put in are of a proper age (not less than two or three years old); that they are sufficiently fenced; and that future damage from shade to the cultivators' fields bordering the road is as far as possible avoided. All this is merely saying that more reliance should not be placed on the voluntary principle than it is able to bear.

| Division. | Total length of avenues at the end of 1887-88. | Length of avenues planted during the year 1888-89. | Total length of avenues at the close of 1888-89. | Length of avenues under operation during 1888-89. |
|---|---|---|---|---|
| Meerut ... ... ... | 450 | 34 | 484 | 429 |
| Rohilkhand ... ... ... | 801 | 26 | 827 | 436 |
| Agra ... ... ... ... | 446 | 21 | 467 | 738 |
| Allahabad ... ... ... | 627 | 56 | 683 | 532 |
| Benares ... ... ... | 611 | 36 | 647 | 322 |
| Jhánsi ... ... ... | 313 | 22 | 335 | 320 |
| Kumaun ... ... ... | 69 | ... | 69 | 31 |
| Lucknow ... ... ... | 298 | 28 | 326 | 169 |
| Fyzabad ... ... ... | 326 | 18 | 344 | 207 |
| Sitapur ... ... ... | 201 | 19 | 220 | 315 |
| Rae Bareli ... ... ... | 172 | 9 | 181 | 71 |
| Total ... | 4,314 | 269 | 4,583 | 3,570 |

10 The number of nurseries during the year was 189 against 213 in the preceding year. They supplied 1,80,000 plants to groves and avenues. Seventy-one groves covering an area of 524 acres were also maintained, the total number in the previous year being 68. These are for the most part encamping grounds. The replanting of such spaces as trees become old or deceased is of great importance, but I am afraid it is sometimes overlooked. With regard to nurseries, my opinion was recently asked by Government as to whether it is desirable to maintain numerous nurseries by enlisting the services of chaukidárs of rest houses and staging bungalows. I expressed the opinion that in each district the maintenance of a permanent nursery at the headquarters station under a well-trained native gardener is indispensable, and that temporary or subsidiary branch nurseries outside the headquarters station should be located usually near the tahsíls in order that they may be supervised by the Tahsíldár. Where a rest house is in the neighbourhood of a tahsíl its compound may often be conveniently utilized for the nursery and a gardener-chaukidár entertained. But where this is not the case the expedient is not likely to be a success. These views are, I believe, confirmed by the failure of dák bungalow nurseries in the Bara Banki district.

## SECTION V.

### AGRICULTURE, INCLUDING EXPERIMENTAL FARMS.

11. **Cawnpore experimental station.**—No change occurred during the year under report in the area or working of this farm. But in accordance with the orders of Government the reports on the kharíf and rabi seasons, which used to be issued separately, were this year included in one volume. The farm was started in 1874: it is now 15 years old. The experiments are conducted in two places, (1) in a group of fields called "the farm" consisting of 89 bíghas and 9 biswas, (2) in the old public garden called "the Company Bágh," in which about 12 acres of land have been cleared for growing cereals.

The chief points aimed at by the experiments are:—

*(a)* to estimate the value and utility of improved methods of farming compared with indigenous methods;

*(b)* to form an idea by weighment of crops of the character of seasons in point of outturn, and thereby obtain independent data for checking the agricultural forecasts of harvest yield obtained from the several districts of the province;

*(c)* to produce pedigree seed for distribution in the country.

All the experiments conducted may be classed into two groups—

I.—Permanent—

*(a)* kharíf, *(b)* rabi.

II.—Temporary—

*(a)* kharíf, *(b)* rabi.

The permanent kharíf experiments are three and the rabi eight in number. These are continued year after year, without any change in the nature of the experiments or of the fields.

The temporary kharíf experiments are 11 and the rabi 13 in number. These are changeable in respect of term and in respect of the particular plots under experiment.

Of the kharíf experiments it may be briefly said that the season was exceptionally bad, owing to the continuous and protracted rains, and that the experiments more or less failed; sugarcane alone was good. In indigo the chief experiments are (1) with gypsum as a manure, (2) early *versus* late sowing. The crop was poor on all the plots, but there was evidence that early sowing and gypsum are both beneficial. The rabi experiments are chiefly restricted to wheat; but potatoes, barley, peas and gram have

lately been added. The result of a five years' average on the wheat experiments are graphically shown in Appendix D. The value of saltpetre and bone-dust fertilizers is there clearly brought out. Also the fact that the yield of the "duplicate" series of plots, on which maize is alternated with wheat, is generally greater than the similarly manured "standard" series on which wheat is grown without change year after year. The value of indigo refuse is also noticeable.

Besides the permanent experiments on the Rothamstead principle a number of other experiments are being prosecuted with different varieties of wheat, with miscellaneous substances as manures, with green soiling and with deep ploughing. The value of gypsum is also tried with gram and peas, both being leguminous crops, and several manure experiments with potatoes are being conducted. Huskless barleys are also being grown, as they have attracted attention in England for malting purposes.

The farm also grows Muzaffarnagar wheat in considerable quantities for distribution to agriculturists. Attached to it are workshops where ploughs and other improved implements are made up and sent to shows and experiments, or sold to private purchasers.

The Assistant Director who is in charge of the farm reports that he considers that it has a real, though possibly slow and limited, influence on native agriculture. A good many persons, he believes, learn good lessons from it every year. Visitors from long distances come to see the farm, and each of them takes away with him some good and new idea from the place. People often apply to hire or borrow the services of the farm apprentices and of the labourers for teaching their own men at their own homes. Some send their men to live on the farm and to study systematically. During the year under review the services of one apprentice was lent to the Rámpur State. One man was sent to the Central Provinces to teach the people there the art of gur and ráb making. His services were much appreciated, and he has now been sent for again. Two apprentices came to the Farm from the Native State of Rámpur : they resided on it during the rabi and kharíf seasons and learnt every detail of management. The services of another apprentice have lately been applied for by the Director of Land Records and Agriculture, Bengal.

**12. Private Farms.**—Amongst those worked throughout the year may be noted —

(1) The Lyall Farm, Ujhauli, owned by Chaudhri Said-ud-din of Khera, Budaun.

(2) The Demonstration Farm, Meerut, managed by Rai Bahádur Chaudhri Debi Singh of Asoura, Meerut.

(3) The Jatao Farm, the property of Kuar Karan Singh of Jator, tahsíl Ferozabad, Agra. It is a small but well-kept farm.

(4) Mahtab Roy's Demonstration Farm, owned by Mahtab Roy of Meerut.

(5) Lachman Pershad's farm at Cawnpore. This covers an area of 165 acres, and is conducted by my Personal Assistant at his own risk in a most intelligent and praiseworthy manner.

(6) The Jumnapar Agricultural Association. This Association has no farm of its own, but labours to introduce improved seeds and implements into the Allahabad district.

No. 1 is solely kept up for experimental purposes. A special overseer is employed by the owner throughout the year for conducting experiments, which are carried nearly on the same lines as on the Government Experimental Station, Cawnpore. The whole cost of the farm is borne by the owner. Improved implements are used. In connection with the farm there is a seed store from which different kinds of improved seed is sold to the public, and Muzaffarnagar wheat in very large quantities

distributed. The Assistant Director visited this farm on the 20th of July at the occasion of distribution of prizes to the growers of Muzaffarnagar wheat. He found the farm in excellent order.

No. 2 was started in 1885 and maintained by this Department for the first three years. As it did not pay, it was resolved to give it up, but Chaudhri Debi Singh, now Rai Bahádur, offered to keep it up at his own expense, provided the farm buildings and the services of the Superintendent were lent to him. This was acceded to, and the farm is now under his management. I visited it in August and consider it well maintained.

13. **Saharanpur Botanical Gardens.**—Excessive rainfall occurred in September, and a violent storm uprooted numerous trees in the gardens; the winter was, however, mild and unusually free from frost, so that the season on the whole was favourable. The financial results of the year were very satisfactory. The cash receipts amounted to Rs. 16,120; adding to this the value of seeds and plants distributed to soldiers' gardens and the saving to Government by use of the drugs grown at the gardens, the total revenue of the gardens amounted to Rs. 21,093 against an expenditure of Rs. 18,910. The rose garden was enlarged and a plot of waste brought under tillage. The fruit crop was above the average and its sale yielded a good return. The number of plants and cuttings distributed during the year was larger than in the preceding year and the demand for acclimatized seeds shows a good increase. The demand for gardeners trained in the gardens was in excess of the number available, and the high wages which this class of men obtain show the esteem in which they are held by the public. Interesting experiments were conducted with foreign varieties of sugarcane and wheat and huskless barley for malting purposes; a number of exotic fruit trees and vines were also under observation. The utility of the mesquit bean as a fodder tree and of the paper mulberry for plantation on *usar* land deserve special mention among the plants under experiment and observation.

14. **Lucknow Horticultural Gardens.**—The general management of the gardens and the financial results of the year are highly creditable to the Superintendent. The total cash receipts amounted to Rs. 12,236 against Rs. 11,063 in the previous year, and the total expenditure to Rs. 14,897 against Rs. 14,460. The extreme heat and dryness of May and June, 1888, proved fatal to some fruit trees and the rains of February and March, 1889, ruined the experimental crops of wheat. The yield of fruit, however, was generally good. Some plots of land under exhausted fruit trees were cleared, manured and replanted; and the cultivation of new varieties of the peach, orange and lemon tribes continued to receive attention. Flower culture was steadily prosecuted, and the sale of ornamental plants and trees was greater than in any previous year. The combined eucalyptus and date plantation was unfortunate in the loss of a large number of date trees and in the destruction of eucalyptus seedlings by whiteants. The results of the paper making experiment with the bark of the paper mulberry show that the prospects of making the cultivation of this tree pay are small; its culture will, however, be kept up for the present. The demand for trained gardeners continues here also as in Saháranpur, and a good many boys are in training.

15. **Motesar Orchard, Kumaun.**—The progress in this garden under the supervision of the Manager of the Kausanie Tea Factory, near Almora, which was reported last year, has been maintained. With the exception of one spur all the garden is now completely terraced: roads and drains have been repaired, and the cultivation of the terracing made last year thoroughly attended to. Over two acres of new land have been formed into a "stock nursery" and are being filled up with young stock for grafting from which applications for grafted trees will be met. Previously the apple grafts were scattered over the gardens, and in the snows of winter distribution was often impeded. The nursery now formed is on a lower elevation. The greater part of the garden is under mature or maturing apple trees, maintained primarily for the purpose of furnishing

grafts for young stock. Hitherto the yield of fruit has been small, as the trees have been insufficiently pruned and the soil in parts requires manure. But with the care now bestowed on the garden, some returns from fruit may be expected. A small portion of the garden is under potatoes, which are sold for seed. The demand for good potato seed both in the hills and in the plains is now so great that this year the indents received by the Manager were far in excess of the available supply. The rate charged to the public was Rs. 3 per maund, exclusive of package and carriage, and judging from the prices realized by native growers of hill potatoes of a very inferior kind this must be regarded as very moderate. The expenditure on the garden has hitherto averaged Rs. 1,900 a year, and the receipts, exclusive of recoveries on account of carriage, are now about Rs. 1,100. An additional grant this year has enabled the garden to be much improved, but further outlay is still necessary if it is to be properly developed and made a useful and profitable centre for the supply of grafted fruit trees to the district of Kumaun. During 1888-89, 377 pear trees and 3,832 apple trees were distributed. The Manager reports that the garden establishment has given him entire satisfaction.

16. **Date Palm Plantations.**—In the notice of the Lucknow Horticultural Gardens mention has been made of the losses among the Arabian date palms. Thirty-four trees now bear fruit, but it fails to ripen, or, more strictly speaking, it rots and drops off before ripening. I believe that Dr. Bonavia, who was mainly instrumental to introducing the experimental cultivation of the Arabian date palm into these provinces, in the hope that it might prove a useful addition to the fruit supply of the country, now admits that in years of ordinary rainfall the damp is too great to allow the fruit to mature. It is, however, contended that the trees may prove useful in a year in which the rains fail. As yet no such season has occurred since the trees have matured. But assuming this expectation is ultimately realized, there seems little future in these provinces for a tree that is absolutely useless for nine in every ten years.

17. **Forecasts of special crops.**—In addition to the forecasts of wheat, oilseeds and cotton crops submitted by the Department in the preceding year, two forecasts were this year prepared for the indigo crop of the province. Bulletins concerning each crop were regularly received from the members of the Agricultural Association and other principal zamíndárs of the province who have enrolled themselves as correspondents.

## SECTION VI.

### Introduction of Agricultural Improvements.

18. **Agricultural Shows.**—As was remarked last year these shows continue to grow in popular favour, and several new ones have lately been started in districts where they were formerly unknown. As far as is practicable, this Department contributes to every show a collection of improved agricultural implements, one or two trained apprentices being deputed to work them. The more important shows are also visited by the Director or Assistant Director. The services of the Assistant Director in this connection have repeatedly been brought to the favourable notice of Government. His well-delivered lectures on agricultural subjects and his expositions of the working of the ploughs, pumps and other improved implements of the Department are now a well-known feature in the programme of every important show. He has contributed the following note on some of the points which his experience indicates are apt to be overlooked by the local managers :—

(1) District shows are often insufficiently advertised, and the dates are sometimes changed on short notice. The Assistant Director considers that notices in Hindi should be sent a considerable time beforehand to every large village in the district, and that the annual date fixed for the show should be strictly adhered to. Shopkeepers, cattle merchants and cloth dealers cannot afford to come to a show unless they are certain as to the date on which it will be held.

(2) Great care should be taken that the prizes actually reach the cultivators and small zamíndárs whose exhibits are rewarded by the judging committee. This class of exhibitors seldom puts in a good appearance at the show and their prizes have to be sent to them when it is over. Payment in such cases ought to be made by some official of not less standing than the tahsíldár, and, if possible, at a public meeting at the tahsíl or sadar town.

(3) A definite portion of the prize money should be assigned beforehand for the *bonâ fide* exhibits of cultivators (*kashtkars*), otherwise the prizes fall to landlords and wealthy men. A cultivator's bullock has little chance of successfully competing against the costlier animals which a zamíndár can afford to keep.

(4) In some districts unscrupulous persons make the capture of the prize money a regular business. They are at the pains to get together by purchase in or out of the district collections of seed-grains and other produce, sufficiently well cleaned, selected and arranged to beat the homelier exhibits of the genuine cultivator. A managing committee should be on its guard against such practices, as they are fatal to the object for which prize money is allotted.

The most successful shows in 1888-89 were those of Aligarh, Meerut, Saháranpur, Etáwah and Muttra. The Government contributions for cattle prizes aggregated Rs. 1,123.

19. **Cattle-breeding.**—Eight bulls of the Kenwaria breed were purchased from Bánda and sent to the Director of Land Records, Assam. Of the five bulls received from Hissar, four were supplied to Bara Banki and one to the Balrampur estate; two other bulls from last year's stock were also sent to Bara Banki.

The small-sized Brittany cattle received a few years ago from the Government of India, for experimental trial in the Himalayas, are maintained on two tea gardens near Almora, Kumaun. As milkers they and their progeny, whole or half bred, are unfavourably reported on; and the absence of a hump prevents their acceptance as plough cattle by native agriculturists. The experiment cannot therefore be pronounced a success. The cattle themselves are in good condition.

20. **Distribution and sale of implements.**—The following statement gives the distribution for the past year compared with the previous :—

| Name of implement. | In 1887-88. | | | | In 1888-89. | | | |
|---|---|---|---|---|---|---|---|---|
| | Sold. | Given on trial. | Given on hire. | Total. | Sold. | Given on trial. | Given on hire. | Total. |
| Ploughs ... ... | 208 | 62 | ... | 270 | 84 | 3 | 7 | 94 |
| Chain pumps ... ... | 33 | 25 | ... | 58 | 22 | 14 | 6 | 42 |
| Sugar pans ... ... | 2 | ... | ... | 2 | 1 | 1 | ... | 2 |
| Grain kibbling mills ... | 40 | ... | ... | 40 | 24 | 1 | ... | 25 |
| Chaffcutter ... ... | 21 | ... | ... | 21 | 8 | 1 | ... | 9 |
| Dredgers ... ... | ... | 2 | ... | 2 | ... | 2 | 1 | 3 |

This branch of work is under the special management of the Assistant Director, and I am indebted to him for the following remarks :—

Our implements may be divided into two subheads : (*a*) implements that are made in the Departmental Workshop and are sold to agriculturists; (*b*) implements and machines that are purchased for trial, *viz.*, that are tried for testing their utility in Indian agriculture. With regard to the implements for sale, great attention is paid to cheapness so as to bring them within the reach of the ordinary cultivator. The follow-

ing table shows how the Farm Workshops have gradually managed to reduce the cost of the chief implements turned out from them :—

| | Price in 1885. | Present price. |
|---|---|---|
| | Rs. | Rs. a. p. |
| Watts' plough ... ... ... ... | 12 | 7 0 0 |
| Kaiser plough ... ... ... ... | 7 | 5 8 0 |
| Small Watts' plough ... ... ... ... | 4 | 2 0 0 |
| Grain kibbling mill ... ... ... ... | 35 | 25 0 0 |
| Chain pump, 5 feet ... ... ... ... | 50 | 45 0 0 |

The reductions have been effected (1) by purchasing most of the materials direct from England; (2) by contracting for the construction of the iron work with the Oudh and Rohilkhand Railway Workshops, the Nahan Iron Foundry, &c., instead of making it in the Workshop through petty and local contractors. Along with this cheapening the quality of the work has actually improved. Notwithstanding this improvement and cheapness, the sale during the year has been much less than that of the previous year. The reason for this is that up to the present year possibly more attention was paid to distribution than to strictly enforcing payment. Implements were not unfrequently given away gratis, or lent on trial, or sold on long credit. Latterly in view of the heavy outstandings for unpaid bills and of the necessity for economy, the Department has adopted the rule that when implements are sold to a non-official purchaser, he must pay for them before delivery. This has reduced the demand, and some indentors after being informed of the new rules have cancelled their orders. The rules, however, appear expedient, as great difficulty in collecting bills has been occasioned in the past, and it is only right that persons who agree to pay should be made to do so.

Another reason for the decrease is that hitherto a regular staff of muharrirs was maintained who used to go from district to district, showing and selling these implements. In some years six or eight muharrirs were employed, each having two or three districts in his circuit with three or four paid ploughmen under him, and carrying about a stock of these implements in a cart. They were usually sold on the understanding that the purchasers were to pay in three years by three instalments. Considerable losses and bad debts have caused this to be stopped. These are the chief causes of the decrease in sale. I am, however, glad to note that the people are steadily becoming aware of the utility of our ploughs and pumps, and we now have the assurance that every purchaser has a genuine intention of giving his purchase a fair trial.

About two or three years ago there was a much larger sale for the sugar pan than now. The high price (Rs. 40) is the only explanation. The grain kibbling mill and the chain pumps are increasing in popularity.

21. **Distribution of seed.**—The following statement shows the amount and kinds of seed distributed during the year :—

| Name of seed. | Distributed in 1887-88. | Distributed in 1888-89. |
|---|---|---|
| | lbs. | lbs. |
| Wheat Muzaffarnagar ... ... ... ... ... | 29,602 | 39,767 |
| „ Mundia ... ... ... ... ... | 2,214 | 963 |
| „ Buxar ... ... ... ... ... | 328 | 125 |
| „ Sindhi ... ... ... ... ... | ... | 608 |
| „ Adelaide ... ... ... ... ... | ... | 563 |
| Oat ... ... ... ... ... ... | 1,045 | 7,367 |
| Peas ... ... ... ... ... ... | 276 | 683 |
| Sorghum ... ... ... ... ... ... | 1,055 | 729 |
| Nankin cotton ... ... ... ... ... | 166 | 14 |
| Guinea grass ... ... ... ... ... | 12½ | 4½ |
| Lucerne ... ... ... ... ... ... | 51¾ | 26½ |
| Tobacco ... ... ... ... ... ... | 26 | ¼ |
| Mangold ... ... ... ... ... ... | 59 | 2 |
| Turnip ... ... ... ... ... ... | 13 | 4¼ |
| Carrot ... ... ... ... ... ... | 7 | ... |
| Country barley ... ... ... ... ... | ... | 740 |

The demand for Muzaffarnagar wheat is noticeable. Several members of the Agricultural Association maintain large stocks of this seed, which they advance to cultivators on reasonable terms of repayment at harvest time. The seed supplied by the Government Farm at Cawnpore is undoubtedly purer, as more care is taken in its selection. But the cost of carriage to different parts of the province makes it desirable to associate local agriculturists in the work of distribution.

22. **Agricultural Journal.**—The experimental issue of the journal in Hindi not proving financially successful, it has been discontinued. The journal is now published in Urdu only. The number of subscribers at full rates has risen to 75. The total issue is now over 200 a month. The journal is printed at the Newal Kishore Press at a cost of Rs. 240 the year. The matter is partly original and partly translations from English agricultural journals.

23. **The Agricultural Association.**—No meeting of the Association was held during the year, but the members rendered useful assistance to the Department in furnishing forecasts of crops and in expressing opinions or collecting facts on matters referred to them. Some of the members have also shown interest in the distribution of seed to cultivators and in the conduct of agricultural shows.

24. **Ploughing Demonstrations.**—It was mentioned last year that the practice of sending out ploughmen to selected districts to give instruction to cultivators in the use of the Watts' and other improved ploughs had been discontinued from motives of economy. There was a further reason in the fact that the men were under no proper control and in individual instances misconducted themselves. Ploughs and other implements are now exhibited at agricultural shows either by the Assistant Director or by an apprentice, and occasionally men are deputed for a similar purpose from the farm to estates of native gentlemen at the request of the owners. During the year a good many ploughs, pumps, harrows and the like were loaned out to private persons from the farm.

## SECTION VII.

### Registration of Traffic.

25. **Trade.**—The following traffic was registered during the year 1888-89 :—

1. Foreign traffic with Thibet and Nepál.
2. Traffic with Bengal by the river Gogra.
3. Traffic by rail with other British provinces and native states.

26. **Traffic with Thibet and Nepal.**—The cordon of posts maintained for the registration of this traffic remained unaltered. The posts on the Nepál frontier were all inspected by inspectors attached to the Department, while one of the five posts maintained on the Thibet frontier was visited by the Senior Assistant Commissioner, Kumaun. The registration work was generally found satisfactory. The following table compares the total commerce transacted during the year under report with that transacted in the previous year :—

| Description of Traffic. | 1888-89. | | 1887-88. | |
|---|---|---|---|---|
| | Weight. | Value. | Weight. | Value. |
| *Imports.* | Mds. | Rs. | Mds. | Rs. |
| From Thibet ... ... ... ... | 1,13,529 | 8,58,291 | 65,473 | 5,07,787 |
| From Nepál .... ... ... ... | 26,92,572 | 56,99,519 | 33,82,566 | 66,37,883 |
| Total ... | 28,06,101 | 65,57,810 | 34,48,039 | 71,45,670 |
| *Exports.* | | | | |
| To Thibet ... ... ... ... | 1,14,433 | 4,34,034 | 60,997 | 3,09,724 |
| To Nepál ... ... ... ... | 2,47,213 | 35,21,732 | 2,73,582 | 37,58,994 |
| Total ... | 3,61,646 | 39,55,766 | 3,34,579 | 40,68,718 |

The decrease in the import from Nepál occurred mostly under grain and firewood; and in the export under cotton piece-goods, metals and salt. The increase in the traffic with Thibet occurred in borax, wool, salt and grain.

| *Import from Nepál* | Mds. | Rs. | *Export to Nepál* | Mds. | Rs. |
|---|---|---|---|---|---|
| Total decrease ... | 6,89,994 | 9,38,364 | Total decrease ... | 26,369 | 2,37,262 |
| Decrease under grain, | 5,40,324 | 7,80,572 | Decrease under cotton piece-goods. | 3,776 | 1,39,243 |
| Ditto firewood, | 1,22,113 | 30,528 | Ditto under metals ... | 1,269 | 43,875 |
| | | | Ditto under salt ... | 15,604 | 31,765 |
| *Import from Thibet* | | | *Export to Thibet.* | | |
| Total increase ... | 48,056 | 3,50,504 | Total increase ... | 53,436 | 1,24,310 |
| Increase under borax, | 24,387 | 1,57,651 | Increase under grain ... | 51,818 | 1,47,537 |
| Ditto under salt | 18,856 | 78,620 | | | |
| Ditto under wool | 4,548 | 1,03,994 | | | |

27. **Traffic with Bengal by the river Gogra.**—The total traffic with Bengal by the river Gogra amounted to 48,16,400 maunds. The exports consisted chiefly of grain, oilseeds, sugar and timber, and the principal imports were grain, salt, tobacco and iron.

| | Mds. |
|---|---|
| Total exports ... ... ... ... ... | 38,86,885 |
| Exports of grain ... ... ... ... ... | 16,55,450 |
| Ditto of oilseeds ... ... ... ... ... | 13,61,130 |
| Ditto of sugar ... ... ... ... ... | 6,65,632 |
| Ditto of timber ... ... ... ... ... | 1,99,062 |
| Total imports ... ... ... ... ... | 9,29,515 |
| Import of grain ... ... ... ... ... | 4,87,359 |
| Ditto of salt ... ... ... ... ... | 1,59,050 |
| Ditto of tobacco ... ... ... ... ... | 72,215 |
| Ditto of iron ... ... ... ... ... | 44,819 |

28. **Rail-borne traffic.**—The new line of the Indian Midland Railway in the Jhánsi division from Kálpi southwards was constituted into a separate internal block from April, 1888, and the Madras seaports were formed into a block by themselves, their traffic like that of Calcutta and Bombay being shown separately from the rest of the province in which they lie.

The registration arrangements were somewhat altered during the year under report. Hitherto returns of all traffic which passed over any portion of the East Indian Railway were compiled for the Local Governments of the North-Western Provinces and Oudh, Bengal and the Panjáb at the Jamalpore office of that railway, while for the Governments of Bombay and Madras returns were compiled in the office of the Examiner of Guaranteed Railway Accounts, Bombay, independently of the Jamalpore office. The invoices in each case formed the basis of registration, but in their transmission from one office to another they were sometimes so much delayed that frequently goods registered in one quarter in the Jamalpore returns were registered in another quarter in the Bombay return, and thus discrepancies constantly occurred in the returns published by the Governments of Northern and Southern India. To avoid these discrepancies and to ensure early publication of returns a fresh division of work has been introduced in the principal railway offices where these returns are compiled. The East Indian Railway office now furnishes returns of imports from Southern India only, the exports to Southern India being tabulated and furnished by the Examiner of Guaranteed Railway Accounts, Bombay; the compilation of the returns of imports into the Panjáb and Sindh being likewise transferred to the office of the Auditor, North-Western Railway. Railway plant and rolling stock were removed from the list of articles adopted for registration of rail-borne traffic returns from the commencement of the present year; two new subheads, *mandwa* and *chena*, were added under "grain."

As in the preceding year the goods imported into these provinces are valued at the rates prevailing in the provinces from whence they were imported, while the exports are valued at the rates prevailing at the Cawnpore market.

The total traffic of the united provinces with the other British provinces, ports and native states, amounted to 4,04,60,153 maunds, valued at Rs. 26,07,87,485, during the year under report, against 4,55,54,763 maunds, valued at Rs 30,53,32,736, reported last year. From the latter, however, 69,15,284 maunds from weight and Rs. 5,18,95,629 from value must be deducted on account of railway plant and rolling stock included in the last year's report, before any comparison is made of the two years' traffic.

| | 1887-88. | | 1888-89. | |
|---|---|---|---|---|
| | *Weight.* | *Value.* | *Weight.* | *Value.* |
| Exports from N.-W. Provinces and Oudh ... | 2,02,50,674 | 14,41,81,055 | 2,29,06,867 | 15,13,83,690 |
| Imports into N.-W. Provinces and Oudh ... | 1,83,88,805 | 10,92,56,052 | 1,75,53,286 | 10,94,03,795 |
| Total ... | **3,86,39,479** | **25,34,37,107** | **4,04,60,153** | **26,07,87,485** |

The increase in exports is chiefly accounted for by larger exports of wheat, rapeseed and poppy seed to Bombay; of linseed and hides to Calcutta; of coal to the Panjáb and Rajputana; of provisions to Calcutta, Bengal, Panjáb and Rájputana, and by the higher value of cotton and sugar. Against these increases has to be set a slightly diminished export of opium to Calcutta. Decrease in the quantity of the imports is principally due to less imports of grain from Bengal and the Panjáb, and of metals and provisions from Calcutta; the value was, however, more than kept up by an increased import of cotton goods from Calcutta, woollen goods from the Panjáb, coal from Bengal and salt from Rájputana.

| | *Weight.* | *Value.* |
|---|---|---|
| | Mds. | Rs. |
| *Export.* | | |
| Total increase ... ... ... ... | **26,56,193** | **72,02,635** |
| Increase under wheat to Bombay ... ... | 6,17,506 | 13,82,923 |
| Ditto rapeseed ditto ... ... ... | 7,40,986 | 30,93,097 |
| Ditto poppy seed ditto ... ... ... | 2,73,344 | 12,74,152 |
| Ditto linseed to Calcuta ... ... | 4,09,070 | 12,81,686 |
| Ditto hides ditto ... ... ... | 1,164 | 7,38,309 |
| Ditto coal to Rájputana and Panjáb ... | 4,75,593 | 4,75,593 |
| Ditto other provisions to Bengal, Calcutta, Panjáb and Rájputana ... ... | 82,077 | 16,66,869 |
| Ditto in the value of cotton ... ... | ... | 40,28,332 |
| Ditto ditto sugar... ... ... | ... | 11,64,247 |
| Less decrease under opium to Calcutta ... ... | 29,064 | 84,28,560 |
| *Import.* | | |
| Total decrease in weight ... ... ... | **8,35,519** | ... |
| Total increase in value ... ... ... | ... | 1,47,743 |
| Decrease under grain from Bengal ... ... | 18,83,695 | 35,18,518 |
| Ditto ditto Panjáb ... ... | 7,32,751 | 16,35,490 |
| Ditto metals from Calcutta ... ... | 29,440 | 25,30,722 |
| Ditto provisions ditto ... ... | 46,516 | 11,23,493 |
| Less increase under cotton goods from Calcutta ... | 90,279 | 63,53,361 |
| Ditto woollen goods from Panjáb ... | 7,633 | 13,26,236 |
| Ditto coal from Bengal ... ... | 12,81,988 | 4,80,745 |
| Ditto salt from Rájputana ... ... | 3,57,099 | 17,70,389 |

## SECTION VIII.

### MISCELLANEOUS.

**29. Provincial Museum.**—The additions to the Museum and its Library during the past year were numerous and some of them very valuable. Various improvements were effected in arranging and exhibiting the collections. The number of visitors registered by the turnstile was 206,128, or less by 80,000 than the estimated attendance of former years.

In accordance with para. 1 of the Government of India's Resolution No. $\frac{24}{4-2}$, dated the 28th March, 1889, rules for the acquisition of objects of archæological interest for the Museum were framed under the Indian Treasure Trove Act and published for general information.

**30. Lucknow muslins.**—In June last, in compliance with a request of the well-known London firm of Liberty & Co., a consignment of Lucknow muslins of specified lengths and patterns was sent to them. This has now been followed by a larger order which I have arranged to execute. The industry has a special interest as being one in which the workers are for the most part *parda nashin* women.

**31. Agricultural Entomology.**—On receipt of the Government of India's Circular No. $\frac{25\text{-A}}{9-10}$, dated 6th March, 1888, directing me to place myself in communication with Mr. Cotes, Assistant Superintendent, Calcutta Museum, and to help him in the study of agricultural entomology, instructions were issued to the Superintendents, Government Gardens, Saháranpur and Lucknow, to the overseers of the Cawnpore Farm and of the usar plains of Cherat and Gursikran in Aligarh and Amramau in Cawnpore, to the Superintendent of the Meerut and other private farms, and to such correspondents of the Department as take an interest in the agriculture of the country, for collection of insects injurious to agricultural products. Seventeen samples were received during the year and forwarded to Mr. Cotes, with a short account of the injuries they do and the crops they principally affect.

**32. Export of Bones to Europe.**—The Government of India in its letter No. $\frac{67\text{A}}{112-1}$, dated 4th October, 1889, drew attention to the increasing export of bones from the Indian ports to Europe, and to the consequent drain on the manurial resources of the country, and desired that in the next annual report of this Department information should as far as possible be given regarding the sources of this export trade, the extent to which bones are collected in up-country districts, and their treatment before export. Suggestions were also invited as to the possibility of utilizing bones as manure in this country, and a summary of any experiments with this kind of manure which may have been made by the Department in previous years was asked for.

*(a) Sources.*—The carcasses of cattle and other animals, with very rare exceptions, are allowed to lie in ravines and waste places, and it is the bones of these animals that are exported from these provinces. The total number of horses and cattle in the provinces returned for 1888-89 was 23,608,455. Assuming the rate of mortality per annum at 10 per cent. and the weight of dry bones in a carcass at 20 seers, the total weight of bones which annually becomes available for use amounts to over 40,000 tons.

*(b) Collection and export.*—The trade in bones, so far as these provinces are concerned, is of a very recent date; it is entirely in the hands of Eurasians and Muhammadans, who send out agents into districts adjoining the line of rail. These employ coolies, generally of the *Chamár* caste, to collect bones for them, and large stocks ready for despatch may often be seen in the neighbourhood of a railway station. The trade is evidently a profitable and growing one, for I have been surprised during a tour recently made through Southern Oudh and the Azamgarh, Jaunpur and Allahabad districts, to see the number of persons engaged in bone-collecting. The town of Phulpur, 17 miles from the nearest railway station, is an instance of the subdepôts which are spreading over the country. As "bone" does not form a head in the classified list of articles prescribed for registration of rail-borne traffic, the full extent of the traffic is not known. The following figures have been kindly furnished by the Assistant Auditor, East Indian Railway, for the stations on his line in the North-Western Provinces, from which the export of bones in 1888 exceeded 5,000 maunds. Similar statistics for the Oudh and Rohilkhand Railway and other railway lines within the province was not available.

| | Mds. | | Mds. |
|---|---|---|---|
| Cawnpore ... ... | 25,944 | Sirsaul ... ... ... | 7,275 |
| Agra ... ... | 20,119 | Sirathu ... ... ... | 6,604 |
| Allahabad ... ... | 19,986 | Chola ... ... ... | 6,372 |
| Háthras ... ... | 15,556 | Mohar ... ... ... | 5,134 |
| Aligarh ... ... | 14,616 | Fatehpur ... ... ... | 5,024 |

The total value of the bones exported by sea in 1888-89 is given in the note received with the Government of India's orders quoted above at 17·49 lakhs of rupees, the

corresponding weight of which in the monthly returns published by the Government of India is 35,567 tons. The annual statement of the trade and navigation of British India which gives the share contributed by each maritime province has not yet been received by me for 1888-89, so that the quantity exported from the Bengal Presidency in 1888-89 is not known. In previous years the exports from Bengal amounted to one-third of the total exports from India. Assuming that 12,000 tons were exported from Bengal in 1888-89, and that the whole of this quantity was supplied from these provinces, it would still represent only one-third of the total quantity which annually becomes available in those provinces through the normal mortality of horses and cattle. The drain, however, of the export trade on the bone supply of any particular district cannot be measured in this way. The northern districts which border the subhimalayan forests and are essentially pastoral districts are still imperfectly served by railways, and in them the bone trade does not exist. My inquiries lead to the conclusion that the trade is confined to the central and eastern districts lying along the East Indian and Oudh and Rohilkhand Railways, and that even in these the outlying tracts are rarely visited by the bone collector. The villages within a ten-miles radius of the railway stations mainly furnish the supply, and they are now being completely cleared of all old stores of bones which in former days used to decompose through a series of years near the inhabited sites.

*(c) Treatment before export.*—The home collector confines himself to breaking up his spoil with a hammer so as to make it more portable, and no further treatment is usually attempted by the wholesale exporter or the shipper. Occasionally, however, the exporter employs a *dhekli* or stone-mill ordinarily used for grinding lime.

*(d) The use of bones in Indian agriculture.*—At present bones are not directly used in any form as manure by the native agriculturist. Indirectly, as they decay, a portion of the nitrogen and phosphates of which they are composed finds its way to the soil. But this process of nature is wasteful. Caste and superstition would lead the Indian cultivator to reject bone manures even if he were to be convinced of their utility, and hitherto he has been without the knowledge of or the means of obtaining superphosphates, the ordinary form in which bones are now used for manure by the European agriculturist. The present export trade therefore is economically defensible, since one portion of the world is thereby enabled to use with care and knowledge in relation to a special system of agriculture what another portion has for centuries allowed to go to waste. Again, as yet it has not been proved that in Indian agriculture bone manures can be profitably employed. A maund of bone dust costs Re. 1, thirty-five maunds of farmyard manure can be bought for this sum. According to the chemists, the 35 maunds of farmyard manure contain four times as much nitrogen as one maund of bone-dust, and nitrogen is the element conspicuously deficient in Indian soils. Experiments with bone-dust and bone superphosphates have been made for a series of years on the Cawnpore Farm with maize and wheat crops. The general result is that, as compared with the standard unmanured plot, there has been a loss on the crop, the cost of the bone manure overbalancing the value of the increased produce. This is especially the case where bone superphosphates are used, owing to the high price of sulphuric acid. Nothing can be inferred from these experiments as to the possible effect of bone-manures on Indian soils other than the light loams common to the Doáb or on special crops. But as regards soils similar to that of the Cawnpore Farm and the great staple crop of wheat, they suggest the conclusion that the Indian ryot, with a rupee to spend on manures, had better lay it out, as at present, on cowdung or indigo refuse than on superphosphates or bone-dust. In England the peculiar value of bone manures has been established in connection with the turnip, mangel-wurzel, and other root-crops. In India we have no turnips (save as a garden crop), and the area under carrots, potatoes or other root-crops is very limited. The matter is eminently one in which the advice of a really competent chemist, on a full survey of Indian agriculture and a careful analysis of soils, might be most valuable. So much energy and enterprise, European and native, are now engaged in the cultivation of indigo, tea, sugar and jute, that such advice would not fall on barren ground.

33. **Specifications of inventions.**—Twenty-three cases were received during the year from the Government of India for report.

34. **General.**—Colonel Pitcher held the Directorship till the end of March when I relieved him.

Mir Muhammad Husain, M. R. A. C., Assistant Director, held special charge of the Farm, Workshops, Usar Reclamation, and Agricultural Shows, and likewise assisted in the work of inspecting Land Records and of examining candidates for kánungoships. I have already acknowledged his services in the body of this report.

Babu Lachman Parshad Barma, B.A., my Personal Assistant, continued in charge of the statistical work. The registration of rail-borne traffic becomes yearly more complete and onerous with the development of the several railway systems. The ability and care with which increasing work is satisfactorily discharged by him deserve the highest praise.

I have the honour to be,

SIR,

Your most obedient servant,

T. W. HOLDERNESS,

*Director.*

# APPENDIX A.

*Memorandum showing the expenditure and receipts of the Department of Land Records and Agriculture, North-Western Provinces and Oudh, during 1888-89.*

| | Heads of charges. | Budgeted expenditure. | Actual expenditure. | Saving on budgeted expenditure. | Receipts paid into treasury. |
|---|---|---|---|---|---|
| | | Rs. a. p. | Rs. a. p. | Rs. a. p. | Rs. a. p. |
| 1 | Office establishment ... ... | 57,648 0 0 | 26,933 11 10 | 30,714 4 2 | ... |
| 2 | „ contingencies ... ... | 7,964 0 0 | 7,115 14 11 | 848 1 1 | ... |
| 3 | „ travelling allowance ... ... | 3,000 0 0 | 2,511 4 3 | 488 11 9 | ... |
| 4 | Gházipur Tobacco Farm ... ... | 3,300 0 0 | 2,092 5 4 | 1,207 10 8 | 3,250 0 0 |
| 5 | Traffic Registration ... ... | 11,000 0 0 | 9,133 0 0 | 1,867 0 0 | ... |
| 6 | Cawnpore experimental station contingencies, | 9,532 0 0 | 9,530 10 10 | 1 5 2 | 3,269 3 0 |
| 7 | Ditto ditto establishment, | 5,868 0 0 | 3,883 14 8 | 1,984 1 4 | ... |
| 8 | Ditto ditto workshop ... | 7,000 0 0 | 6,510 6 7 | 489 9 5 | 4,634 11 9 |
| 9 | Tea shop charges ... ... ... | 500 0 0 | ... | 500 0 0 | ... |
| 10 | Well fund ... ... ... | 5,000 0 0 | 420 1 0 | 4,579 15 0 | ... |
| 11 | Usár „ ... ... ... | 10,000 0 0 | 9,980 14 9 | 19 1 3 | 1,608 6 3 |
| 12 | Miscellaneous ... ... ... | ... | ... | ... | 1,337 14 6 |
| | Total ... | 1,20,812 0 0 | 78,112 4 2 | 42,699 11 10 | 14,100 3 6 |

Certified that the receipts in this office were checked in the manner prescribed in G. O. Circular No. 34, dated 5th October, 1882.

T. W. HOLDERNESS,
*Director.*

## APPENDIX B.

*Statement showing the arboricultural expenditure and receipts in each district of the North-Western Provinces and Oudh during the year 1888-89.*

| District. | Expenditure on— | | | | Receipts by— | | |
|---|---|---|---|---|---|---|---|
| | Avenues. | Groves and nurseries. | Lopping and felling. | Total. | Lopping and felling. | Fruits, grass, &c. | Total. |
| | Rs. | Rs. | Rs. | Rs. | Rs. | Rs. | Rs. |
| Dehra Dún ... ... | 365 | 20 | 15 | 400 | 5 | ... | 5 |
| Saháranpur ... ... | 1,149 | 648 | ... | 1,797 | 3,098 | 12 | 3,110 |
| Muzaffarnagar ... ... | 2,579 | 276 | 9 | 2,864 | 4,972 | 135 | 5,107 |
| Meerut ... ... | 1,843 | 48 | ... | 1,891 | 3,201 | 162 | 3,363 |
| Bulandshahr ... ... | 1,729 | 375 | 5 | 2,100 | 2,717 | 125 | 2,842 |
| Aligarh ... ... | 1,773 | 567 | 60 | 2,400 | 913 | 178 | 1,091 |
| Total, Meerut Division ... | 9,429 | 1,934 | 89 | 11,452 | 14,906 | 612 | 15,518 |
| Muttra ... ... | 2,347 | 150 | 47 | 2,544 | 894 | 63 | 957 |
| Agra ... ... | 1,758 | 1,214 | ... | 2,972 | 1,077 | 400 | 1,477 |
| Farukhabad ... ... | 1,124 | 176 | 500 | 1,800 | 321 | 105 | 426 |
| Mainpuri ... ... | 971 | 209 | 121 | 1,301 | 656 | 158 | 814 |
| Etáwah ... ... | 1,026 | 61 | ... | 1,087 | 148 | 7 | 155 |
| Etah ... ... | 1,121 | 69 | 10 | 1,200 | 449 | 313 | 762 |
| Total, Agra Division ... | 8,347 | 1,879 | 678 | 10,904 | 3,545 | 1,046 | 4,591 |
| Bijnor ... ... | 846 | 12 | 3 | 861 | 965 | 871 | 1,836 |
| Moradabad ... ... | 1,454 | 396 | 250 | 2,100 | 2,882 | 1,079 | 3,961 |
| Budaun ... ... | 1,006 | 294 | ... | 1,300 | 422 | 502 | 924 |
| Bareilly ... ... | 2,376 | ... | ... | 2,376 | 1,237 | 229 | 1,466 |
| Sháhjahánpur ... ... | 1,086 | 84 | 27 | 1,197 | 773 | 377 | 1,150 |
| Pilibhít ... ... | 98 | 185 | ... | 283 | 75 | 714 | 789 |
| Total, Rohilkhand Division ... | 6,866 | 971 | 280 | 8,117 | 6,354 | 3,772 | 10,126 |
| Cawnpore ... ... | 1,430 | 362 | 6 | 1,798 | 2,007 | 49 | 2,056 |
| Fatehpur ... ... | 1,060 | 190 | 50 | 1,300 | 360 | 164 | 524 |
| Bánda ... ... | 1,981 | 764 | 13 | 2,758 | 636 | 2 | 638 |
| Hamírpur ... ... | 1,295 | 174 | 28 | 1,497 | 200 | 121 | 321 |
| Allahabad ... ... | 1,000 | 758 | 10 | 1,768 | 171 | 770 | 941 |
| Jaunpur ... ... | 1,373 | 381 | 345 | 2,099 | 2,497 | 432 | 2,929 |
| Total, Allahabad Division ... | 8,139 | 2,629 | 452 | 11,220 | 5,871 | 1,538 | 7,409 |
| Azamgarh ... ... | 615 | 185 | ... | 800 | 647 | 107 | 754 |
| Mirzapur ... ... | 1,254 | ... | ... | 1,254 | 145 | 719 | 864 |
| Benares ... ... | 693 | 13 | 236 | 942 | 384 | 630 | 1,014 |
| Gházipur ... ... | 466 | 246 | 15 | 727 | 234 | 209 | 443 |
| Gorakhpur ... ... | 946 | 397 | ... | 1,343 | 12 | 101 | 113 |
| Basti ... ... | 163 | 149 | ... | 312 | 243 | 28 | 271 |
| Ballia ... ... | 439 | 61 | ... | 500 | 42 | 6 | 48 |
| Total, Benares Division ... | 4,576 | 1,051 | 251 | 5,878 | 1,707 | 1,800 | 3,507 |
| Jhánsi ... ... | 2,634 | 364 | 2 | 3,000 | 129 | 215 | 344 |
| Jalaun ... ... | 1,749 | 248 | ... | 1,997 | 87 | 189 | 276 |
| Lalitpur ... ... | 3,584 | 196 | 20 | 3,800 | 22 | 169 | 191 |
| Total, Jhánsi Division ... | 7,967 | 808 | 22 | 8,797 | 238 | 573 | 811 |
| Kumaun ... ... | 200 | 50 | ... | 250 | ... | ... | ... |
| Garhwál ... ... | ... | 598 | ... | 598 | ... | ... | ... |
| Tarái ... ... | ... | ... | ... | ... | ... | ... | ... |
| Total, Kumaun Division ... | 200 | 648 | ... | 848 | ... | ... | ... |
| Lucknow ... ... | 488 | 976 | ... | 1,464 | 354 | 385 | 739 |
| Unao ... ... | 249 | 113 | 42 | 404 | 667 | ... | 667 |
| Bara Banki ... ... | 838 | 159 | 3 | 1,000 | 192 | 336 | 528 |
| Total, Lucknow Division ... | 1,575 | 1,248 | 45 | 2,868 | 1,213 | 721 | 1,934 |
| Sitapur ... ... | 836 | 92 | 4 | 932 | 143 | 20 | 163 |
| Hardoi ... ... | 1,044 | 175 | 20 | 1,239 | 227 | 5 | 232 |
| Kheri ... ... | ... | 193 | 1 | 194 | 52 | ... | 52 |
| Total, Sitapur Division ... | 1,880 | 460 | 25 | 2,365 | 422 | 25 | 447 |
| Fyzabad ... ... | 681 | 86 | ... | 767 | 767 | 82 | 849 |
| Bahraich ... ... | 817 | 73 | ... | 890 | 109 | 54 | 163 |
| Gonda ... ... | 556 | 73 | .. | 629 | 232 | ... | 232 |
| Total, Fyzabad Division ... | 2,054 | 232 | ... | 2,286 | 1,108 | 136 | 1,244 |
| Rae Bareli ... ... | 853 | 110 | 15 | 978 | 79 | 41 | 120 |
| Sultánpur ... ... | 642 | 42 | 16 | 700 | 242 | 150 | 392 |
| Partábgarh ... ... | 480 | 96 | ... | 576 | 610 | 272 | 882 |
| Total, Rae Bareli Division ... | 1,975 | 248 | 31 | 2,254 | 931 | 463 | 1,394 |
| GRAND TOTAL ... | 53,008 | 12,108 | 1,873 | 66,989 | 36,295 | 10,686 +103* | 47,084 |

* Transferred from P. W. D.

# APPENDIX C.

*Statement showing the condition of Usar plots under experiment in the N.-W. P. and Oudh.*

| District. | Serial number of plot. | Situation of plot. | Area in acres. | Date of commencement of treatment. | Method of treatment. | Remarks. | Result of inspection by Director, Botanical Department, in 1888-89. |
|---|---|---|---|---|---|---|---|
| **I.—Under the Irrigation Department.** | | | | | | | |
| Aligarh ... | 1 | At Pardilnagar, opposite the 24th mile of the Sikandra Rao Distributary, Ganges Canal, *(Plot A)*. | 10·8 | 1874 ... | Holes three feet in diameter at top and two feet at bottom, and three feet deep were dug at 10 feet intervals and filled with canal silt, which was raised about nine inches above the ground level. Of the 3,937 beds thus prepared, 238 were sown with babúl seeds; in the remaining 3,669 trees of various kinds—shisham, siras, jámun, &c., were planted, the trees being from three to five feet in height, and a few babúl seeds were sown round the transplants. During the rains of 1874 coarse grass (dab) was planted between the trees in lines one foot apart. From November, 1874 to June, 1875, the plantation was flooded about twice a month. From June, 1875 to December, 1879, it is believed that it was not irrigated. From January, 1880, up to date the grass has been occasionally watered. There are at present 735 trees on this plot, of which 321 are small. The larger trees are very unhealthy. No expenditure was incurred in the year under report and there were no receipts from grass, as no one would buy it. This plot forms with plots B and C an oblong, and a permanent wire fence for the whole has now been sanctioned at a cost of Rs. 645. Excluding this, the total expenditure on the three plots has been Rs. 1,260 from the commencement: the receipts amount to Rs. 35 only, and the value of the standing timber is put at Rs. 115. | The Superintending Engineer reports that in March last he found a luxuriant growth of *dab* grass for which there is no sale. Also patches of *dab* grass here and there. Some of the trees still look healthy, but those of advanced growth are dying off rapidly. | The portion of this plot nearest to the canal lies low, and consequently there is here a more luxuriant growth of grass. For the same reason the trees on this portion are more numerous and in better condition. |

| District. | Serial number of plot. | Situation of plot. | Area in acres. | Date of commencement of treatment. | Method of treatment. | Remarks. | Result of inspection by Director, Botanical Department, in 1887-88. |
|---|---|---|---|---|---|---|---|
| Aligarh—*(continued.)* | 2 | At Pardilnagar *(Plot B)*. Adjoins plot A. | 11 | 1881 ... | In half of this plot ridges were prepared one foot high and 10 feet apart, and were sown with kikar seed. The sowings failed except in a few places where the soil was good.<br><br>In the other half seed-beds were prepared by digging holes three feet in diameter and three to four feet deep and 10 feet apart, the soil of one hole being thrown into the next, so as to invert it; 1,264 beds thus prepared were sown with kikar seeds, but the rains of 1881 were rather unfavourable, and half of the young trees died. In the following year beds were prepared 20 feet apart in the part that had been prepared in ridges. These beds as well as those in which seeds had failed in 1881, had babúl seed sown in them; but fully half failed. There are now 88 kikar trees of some size and 460 young plants. | The Superintending Engineer reports:—"Plots B and C have not improved much since 1885, when I left the Aligarh division; the "kikar" trees in plot B are stunted and sickly; a few "reonjas" and chaunkar trees planted in 1884 are to be seen in plot C: they are now from 7 to 10 feet in height; most of the reonja trees are seeding freely; "usar" grass thrives in plots B and C; the worst of the plot *viz.*, C, looks quite green in comparison with the surrounding usar plain.<br><br>"As a matter of fact nothing has been done lately towards improving the Pardilnagar plantation, but as we have had no return for the money spent previous to 1885, I would confine future operations to the maintenance of a good fence, to felling trees as they die, to cutting the long grass periodically if it cannot be sold, and to experiment with exotic plants that are likely to succeed in usar tracts. It would appear from the report on the Saháranpur Botanical Gardens for the year ending 31st March, 1889, that the paper mulberry (Brow's sonetia papyrifera) gives 'greater promise of success in usar and reh tracts than the Australian salt bush;' a small quantity of seed should be obtained by the Executive Engineer of the Aligarh division from the Saháranpur gardens for trial at Pardilnagar." | Plots Nos. B and C adjoin No. A. Judging from the poor condition of the grass on these two plots and the number of trees that have died or are dying, it is evident that the character of the soil is of the worst description. At the eastern end of plot C there is a damp piece of ground where the *jhau* (Tamarix gallica) appears to thrive; also a grass called *Diplachne fusca* which is much eaten by buffaloes. |
| Ditto ... | 3 | Ditto *(Plot C)* ... Adjoins plots A and B. | 2·5 | 1884 ... | Seed-beds, three feet wide three feet deep and ten feet apart, were prepared. A nursery of reonja, chaunkar and kikar was started in February, 1884, and the young plants were put out into the seed-beds at the commencement of the rains, 659 of each kind. The plants throve well till the beginning of October, when abnormally heavy rain fell in the Aligarh district. The plantation and whole country round it was flooded, and most of the plants died. This plot has not been irrigated. | | |
| Etáwah ... | 4 | At Takhran Bridge in mile 35, furlong 2, Etáwah Branch, Ganges Canal. | 60·13 | December, 1873. | About 40 acres of land were enclosed by an embankment. During 1874 the water of the Takhran Distributary was run over this plot for four months; silt varying in depth from | In 1884 the land was leased for Rs. 157-8-0 and in 1885 for Rs. 162-8-0; the price was apparently run up owing to some spite between the | The layer of silt deposited by the water from the Takhran Distributary has provided an excellent soil for the growth of grass and for the cultiva- |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | three feet to four inches, was deposited over the lower portion. The flooding has since been repeated. In May, 1875, the plot was leased for three years, the lessee paying Rs. 25 the first year, and Rs. 33-5-4 for each of the succeeding years. He was allowed water free for the crops grown on the reclaimed land. In October, 1876, the silt accumulated on the left bank of the distributary was levelled off and spread over the adjacent usar to a distance of about 250 feet, the work being done by the lessee in lieu of that year's rent; the land thus reclaimed is over four acres in area. In 1883 it was reported that 33 acres were fairly productive; the rest it is difficult to silt from want of command. Part of the tract is as high as canal full supply, and this is still usar. | bidders. In 1886 only Rs. 72-8-0 was obtained; in 1887 part of the land was let for Rs. 40, and the remaining portion was planted with kikar. At the end of 1888 the culturable area was let to a good tenant on a five-years' lease at a yearly rental of Rs. 60, irrigation being provided free. So far he has done well, as the autumn crop of rice and other grains has been good. | tion of surface-feeding crops, but trees planted here, as soon as their roots have penetrated the soil stratum, will be no more successful than on the open reh tract. |
| Ditto ... | 5 | At Khandan Bridge in mile 78 furlong 5, Etáwah Branch, Ganges Canal. | 11·21 | 1883 ... | Compensation for the plot was estimated by the Collector at Rs. 9 per acre. There were some cultivated patches distributed over the usar. The level of the ground was two to three feet below full supply level on the canal, and there is now a deposit of silt over most of the area. | The estimate for the work amounted to Rs. 576. The expenditure up to 1888 was Rs. 563. The reclamation may now be considered complete, but unfortunately a tenant has not yet been found. Owing to wet seasons much land in the neighhourhood has gone out of cultivation. | The thick layer of silt deposited over the greater portion of this plot has permanently reclaimed the ground for any kind of cultivation. |
| Ditto ... | 6 | Near the Turaia Bridge, mile 55 furlong 6, Etáwah Branch, Ganges Canal. | 21·4 | ... | ... | Work commenced this year on this plot. The plot is very suitable for reclamation, as the full supply level in canal is three to four feet above the ground. During the year Rs. 184 was spent on the purchase of the land, and Rs. 461 on enclosing it with an earthen bund. Sluicing from the canal commenced in December and was continued at intervals throughout the year. The neighbouring silt banks of the canal ditributary had previously been levelled off on to the usar at a cost of Rs. 296. About 10 acres of the land thus treated have now been let out at a gross rent of Rs. 4 to a tenant for 1889-90, so that they may be regarded as in process of being successfully reclaimed. The rest of the land will continue to be sluiced next year. | Not visited. |

| District. | Serial number of plot. | Situation of plot. | Area in acres. | Date of commencement of treatment. | Method of treatment. | Result of inspection by Director, Botanical Department, 1888-89. |
|---|---|---|---|---|---|---|
| II.—Under the Dept. of Land Records and Agriculture. Cawnpore ... | 7 | Juhi, a plain, five miles from Cawnpore. | 102·25 | July, 1882 ... | A.—*Preservation and extension of natural grasses.*—The plain has for this purpose been enclosed partly by wire fence and partly by a ditch: cattle are thus kept off and grazing strictly forbidden except on one plot, to which sheep are purposely admitted at certain intervals. On another plot of equal size to this latter. grass is cut by sickles; while on a third plot the grass is scraped in the ordinary manner by *khurpi* (hand-hoe). On the rest of the plain, grasses are at present allowed to strike root and spread over the land. Measured strips of land are marked out by wooden pegs with a view to watching closely such botanical changes as may take place in the herbage.<br>B.—*Plantation of fuel and fodder trees.*—A large number of babul *(Acacia arabica)*, dhák *(Butea frondosa)*, ber *(Zizyphus)*, nim *(Melia Indica)*, shisham *(Dalbergia sissu)*, siras *(albizzialebleck)*, pipal *(Ficus religiosa)*, gular *(Ficus glomerata)*, bargad *(Ficus Indica)*, and other hardy indigenous trees, as well as a number of exotic plants, such as salt-bush, sheep-bush, rain-tree, &c., have been planted from time to time after the follwing methods:—<br>(1) On slightly elevated spots where grass of a superior kind exists, and soil has not been washed away by erosion.<br>(2) On sides of mounds artificially raised, which offer protection to the plants, when very young, from hot winds, seeds being planted on the sheltered side of the mound.<br>(3) In pits of the following description:—<br>(*a*) dug five feet deep, lined with Willesden rotproof paper, and filled with good soil from cultivated land; | In January, 1888, a portion of this ground was mapped out into squares, each measuring 50 square yeards; and at the same time the condition of the vegetation in 80 of these squares was noted in a book kept for the puprose. The changes observed in November last are numerous and interesting, and have been recorded in minute detail in the note book. |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | | | | | | (*b*) dug to the same depth, but refilled with the same soil and without any lining.<br>C.—*Manure.*—To the worst piece of úsar that could be selected gypsum and farmyard manure have been applied. | |
| Ditto | ... | 8 | Amramau, a plain four miles from Cawnpore. | 52 | July, 1882 ... | This plain is managed entirely on commerical principles. A number of cattle and sheep are kept: they are fed on the grasses which grow on the plain and on the produce of a portion of the reclaimed land; their milk is sold, and the manure applied to the land, which is constantly kept under plough, and as soon as capable of bearing a crop let out to the neighbouring cultivators at reasonable rates. | Visited in November, 1888. An interesting example of reclamation brought about by ordinary agricultural operations. |
| Aligarh | ... | 9 | Gursikran, a plain seven miles from Aligarh. | 718 | August, 1885, | This plain is treated much like No. 7 (Júhi). It has been protected from cattle by a ditch, and the grasses allowed to grow and cover the plain. A nursery is maintained to grow both indigenous and exotic plants, which are planted out where soil is tolerably good. The object in the case of this plain is to ascertain whether by excluding cattle for a number of years, the natural grasses have any chance of obtaining a permanent footing, and to find out which trees do best on a tolerably good class of úsar land. | Plots No. 9 and 10, Gursikran and Cherat near Aligarh were visited in November, 1888, and in March and November, 1889. A portion of the former reserve was marked out in February, 1888, into 49 squares, each measuring 50 square yards. This piece of ground offers much variety in the distribution of the indigenous vegetation; and the existence of many bare patches of different sizes rendered it very suitable for periodical comparison. Here as in Júhi the changes have been numerous and highly interesting. [Extracts from note-book omitted.] In Cherat 86 squares have similariy been marked out and observed. [Extracts from note-book omitted]. |
| Ditto | ... | 10 | Chherat, a plain five miles from Aligarh. | 242 | Ditto ... | This plain has been divided in two parts, one of which is treated exactly like No. 8 (Amramau): The following experiments are conducted in the other part. The whole is protected against cattle by a fencing of barbed wire:—<br>(1) Fuel and fodder trees are planted as in No. 9 (Gursikran).<br>(2) The natural grasses are preserved and allowed to spread undisturbed. | Apart from the facts above recorded, it needs no very high powers of observation to become aware of the great changes which the vegetation of the enclosed areas has undergone compared with the condition of the meagre herbage outside. The evidence also of those who knew the state of these plots before they were enclosed is alone sufficient to show how the vegetation has increased. This as we well know, is the usual result of protecting grass lands from grazing. It is quite possible too that the sudden spurt given to the vegetation of a protected area may start a series of conditions favorable to vigorous competitions amongst the various species and individuals of plants for the occupation of every piece of ground capable of supporting vegetable life.<br>The indigenous vegetation of the úsar tracts in the Doab is composed chiefly of grasses, and of these there are two kinds which are eminently characteristic of reh-infected soils, *viz.*, the *kár úsara* grass *(Sporobolus pallidus, Nees, var)* and *Tetrapogon tetrastachys Hack. Ms.* The former is the prevailing grass in the Aligarh district, and the latter at Cawnpore. It is remarkable that till quite recently neither of them had been botanically identified. They both thrive where the soil is distinctly saline and more or less efflorescent, and over large areas constitute the only vegetation. Here and there where the *reh* salts are in excess the ground is bare, and it is by the encroachment of one or other of these two kinds of grasses that the bare patches within the enclosed reserves are gradually diminishing in size. |

| District. | Serial number of plot. | Situation of plot. | Area in acres. | Date of commencement of treatment. | Method of treatment. | Result of inspection by Director, Botanical Department, 1888-89. |
|---|---|---|---|---|---|---|
| | | | | | (3) Exotic grasses are sown.<br>(4) A plot of about 25 acres is flushed with canal water in view to raising meadow grasses.<br>(5) An enbankment has been raised round a piece of low land measuring about 15 acres in order to retain storm-water, and to see whether the land can thus be rendered fit for rice cultivation.<br>(6) The surface of a plot measuring 2·5 acres and yielding an efflorescence of *reh* is annually scraped to test the rate and rapidity of formation of such efflorescence. | A few other kinds of grasses are found more or less abundantly on the *reh*-infected parts, *viz.*, *Eragrostis plumosa (var)*, *E. vis-cosa*, *and Aristida depressa*. The occurrence here and there in clumps or strips of certain grasses not strictly speaking characteristic of *úsar*, is dependent on certain conditions of soil brought about by the action of wind or water. Scattered over the *úsar* plains are many mounds and ridges, the soil of which is found to be comparatively fertile. The origin of these raised portions is not always evident, though in many instances it is probably due to arrested wind-borne débris accumulating round the stems of shrubs or other obstacles. These spots become occupied by various plants which will not grow on the surrounding *reh*-infected soil, *e.g.*, *Janewa (Andropogon annulatus)*, *dab (Cynodon dactylon)*, *makra (Eleusine ægypteaca)*, *anjan (Peninsetum cenchroides)*, Spear grass (*Heteropogon contortus*), and many other herbaceous plants besides grasses. On the low-lying land where water constantly lodges for considerable periods, the two characteristic *reh* grasses are replaced by *dab (Eragrostis cynosuroides)*, *choti gander (Diplachne fusca)*, also by many kinds of sedgelike plants, belonging to the family of Cyperacae. The drainage channels which traverse the *reh* plains are usually edged with *dúb* grass, and the deeper portions are either bare of vegetation or are coated with aquatic plants including Cyperacae. The broad shallow water channels often become filled with a luxuriant crop of *dúb* grass.<br><br>The patches of dead *kár usara* grass occasionally seen in all the reserves, especially in that of Cherat, are evidently the result of deficient drainage. Neither the *kárusara* grass nor the *Tetropogon* can remain long in a healthy state where the water stagnates for any length of time. The experiments now being carried out by Mir Muhammad Husain in the Cherat reserve, where an artificial bund has been erected in order to arrest the drainage water, clearly illustrate this action. There is now a luxuriant growth of grasses, principally aquatic, within the dammed up area which was formerly almost entirely bare and white with efflorescent *reh*. The disappearance of the *kar úsara* grass may be caused therefore either by excessive local accumulation of *reh* salts, or by flooding. It has still to be ascertained whether land which has simply been flooded is rendered permanently unfitted for the growth of the *kar úsara* grass, and to what extent the flood water is capable of removing the *reh* salts from the surface soil. It is on this assumption that Mir Muhammad Husain maintains that the process of artificial flooding should constitute a preliminary stage towards affecting reclamation. The results of the flooding experiment in the Cherat reserve and of the ploughing and manuring operations which are about to be carried on these will be watched therefore with considerable interest. |

*Experimental plantings.*—The great difficulty in all experiments on a large scale with exotic or introduced plants is to secure their establishment, for until the plants are capable of reproducing themselves by seedling or suckers they cannot be considered to have passed out of the experimental stage. The salt-bush *(Artriplex nummularia)* promises to be a success as far as the soil is concerned, the most healthy specimens being those which were planted in soil strongly infected with *reh* salts; but being essentially a desert species the excessive damp to which it is exposed in the Doab during the hot rainy months is prejudicial to its nature. At this season also it is liable to attacks of innumerable caterpillars which devour the leaves and weaken the plants.

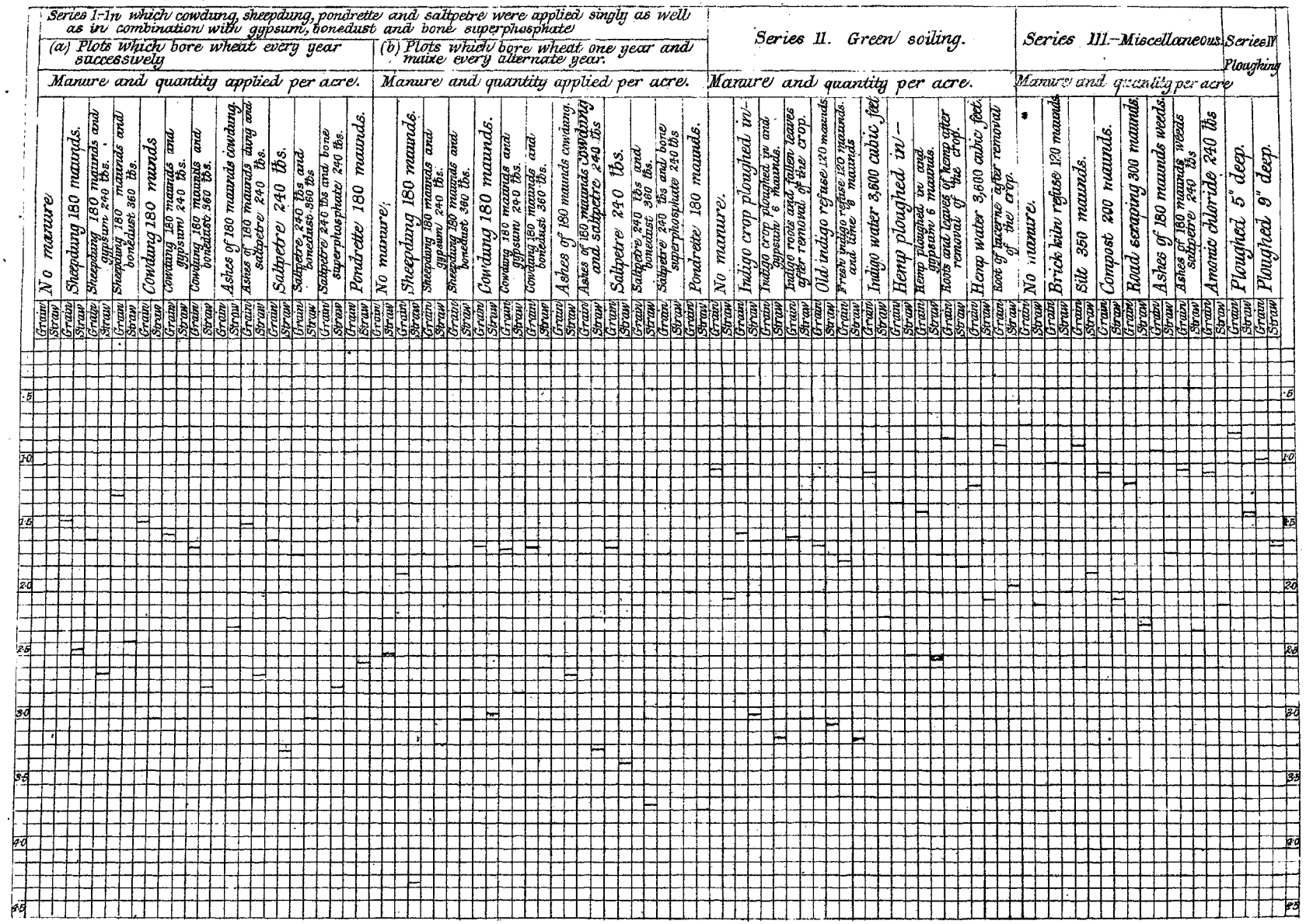
The paper Mulberry has not succeeded as well as was expected, a very small percentage of the large number of plants put out both at Cawnpore and Aligarh having survived. A great many of those which were planted out in the more remote parts of the reserves, appear to have been eaten by deer or uprooted by wild pigs. Of those which have survived, there is a sufficient number of healthy specimens to justify the continuance of the experiment for another year.

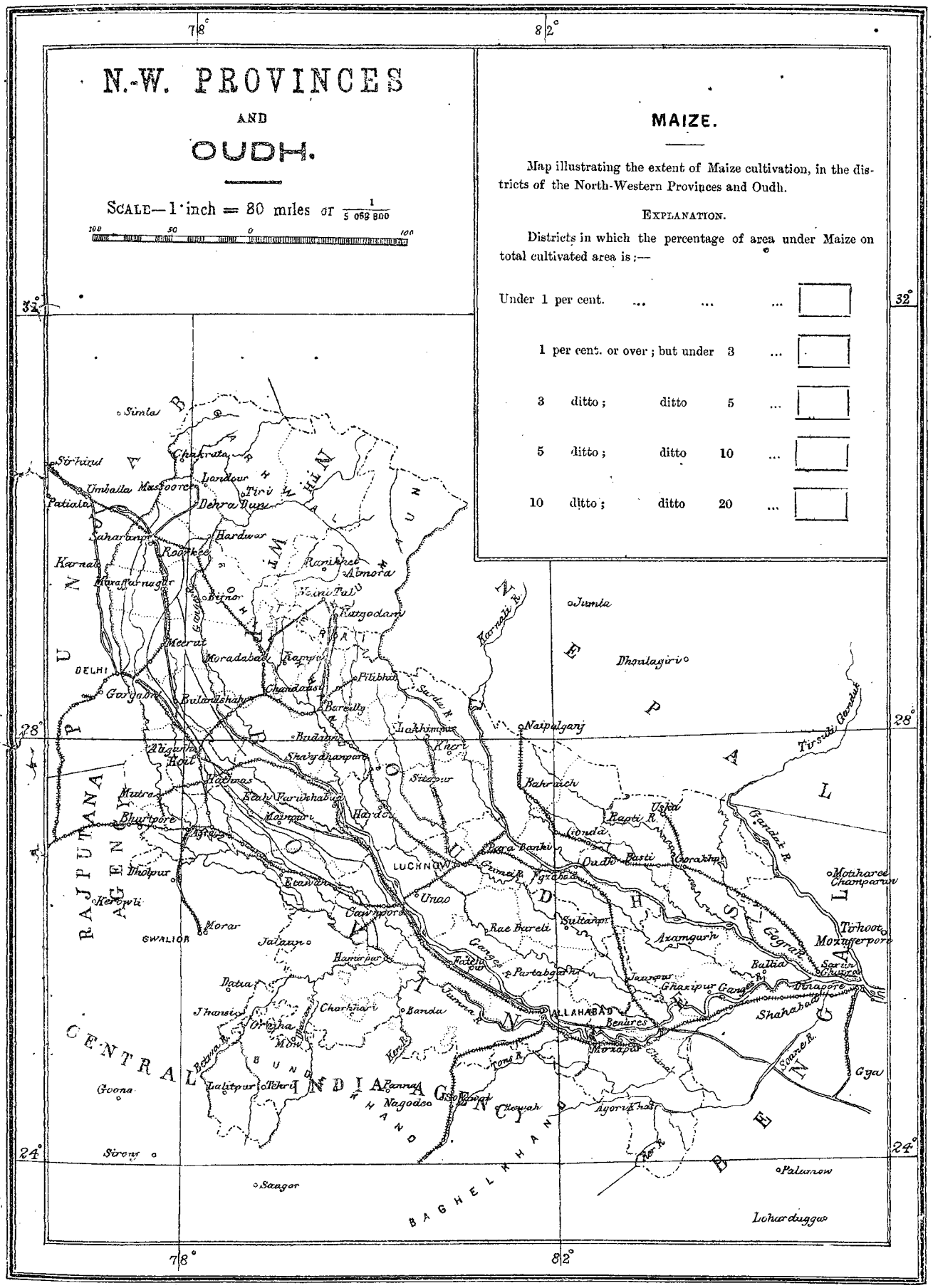
Several hundred seedlings of the date palm were last July put out in the open ground at Gursikran. Judging from their present condition and from the fact of so few of them having died I am inclined to be hopeful of their ultimate success on *úsar* soil. The wild pigs have as yet proved their worst enemy.

Trial sowings will be made during next rains with two other plants, which there is reason to believe, will thriven on *reh* land, *viz.*, *Prosopis glandulosa* and *Sesbania ægyptiaca*. The former, also called the "*Mezquit of Texas*" was introduced into India about 13 years ago on account of its sweet pods, which in its native country are used for feeding cattle. It is evidently a hardy shrub and may be seen thriving on very poor soil by the side of hot dusty roads, close to Cawnpore. The other is the "*Jait*" a soft-wooded and very quick-growing tree, and though only of short duration it is abundantly reproductive. Brandis in his Forest Flora, p. 137, states that it is grown in the drier parts of the Deccan to furnish poles as a substitute for bamboos, that rope is made of the bark and that the wood is used to boil jaggery, and the leaves and branches as cattle fodder. In the Cherat reserve I saw one specimen about 12 feet high, the seed of which was sown last July. I propose therefore to have large quantities of the seeds of these two species sown broadcast next rainy season over portions of each of the reserves.

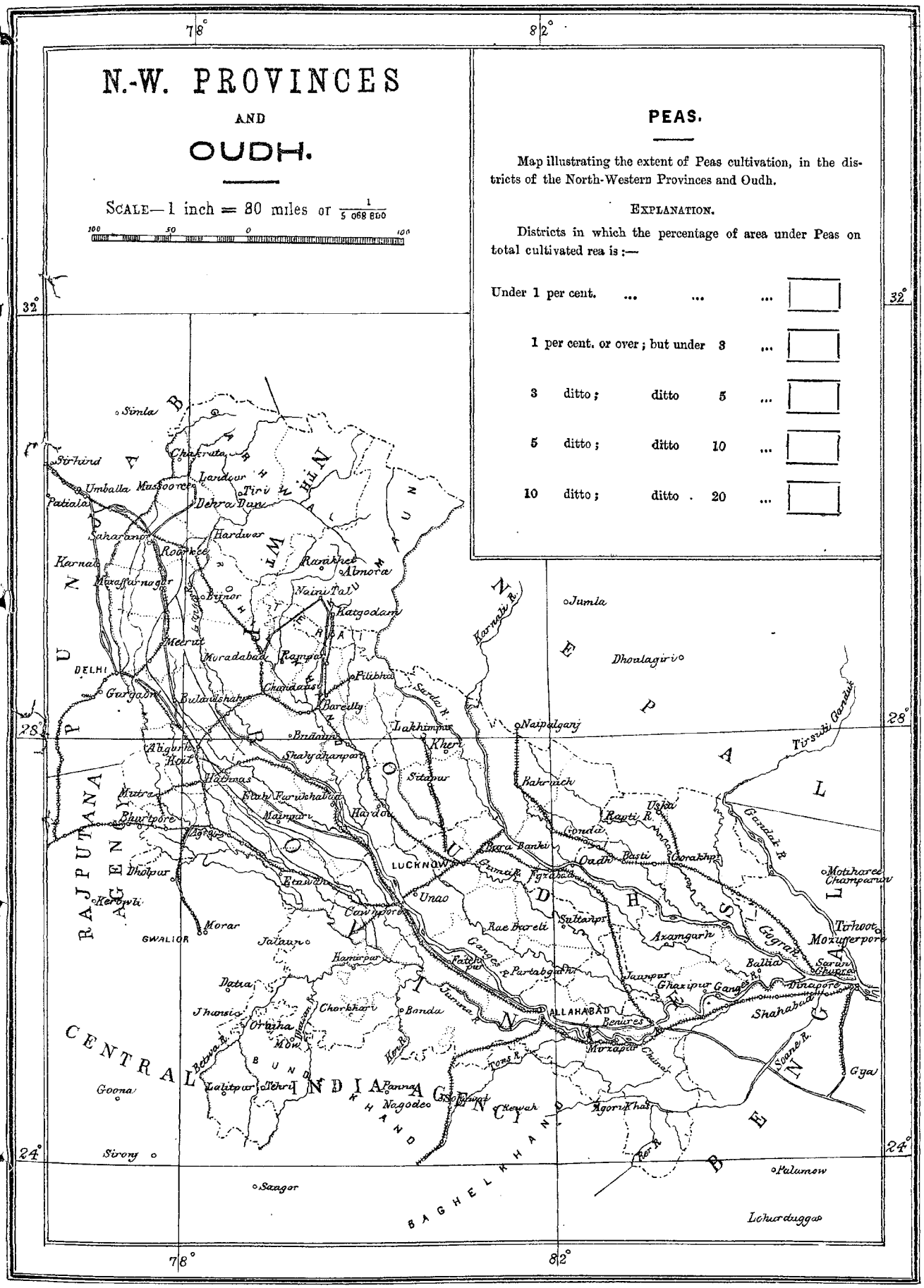
# APPENDIX D.

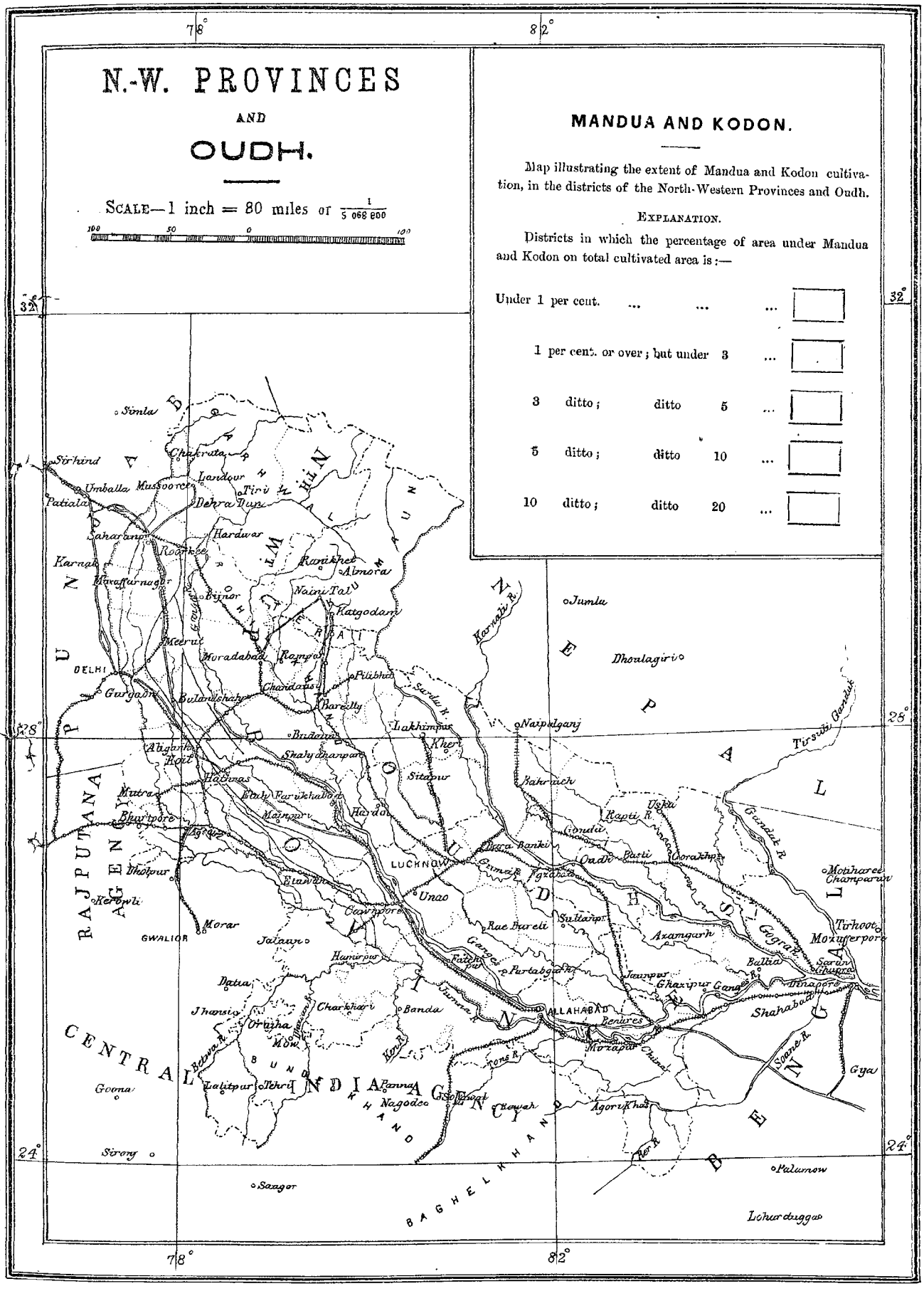
*Diagram illustrating the effect of the various kinds of fertilizers and of different depths of ploughing on wheat at the Cawnpore Experimental Station during the five years 1884-85 to 1888-89, the average results per acre being indicated by lengths of vertical columns. Scale 1" = 10 maunds.*


Series I.—In which cowdung, sheepdung, pondrette and saltpetre were applied singly as well as in combination with gypsum, bonedust and bone superphosphate
(a) Plots which bore wheat every year successively
Manure and quantity applied per acre.
No manure
Sheepdung 180 maunds.
Sheepdung 180 maunds and gypsum 240 lbs.
Sheepdung 180 maunds and bonedust 360 lbs.
Cowdung 180 maunds
Cowdung 180 maunds and gypsum 240 lbs.
Cowdung 180 maunds and bonedust 360 lbs.
Ashes of 180 maunds cowdung.
Ashes of 180 maunds dung and saltpetre 240 lbs.
Saltpetre 240 lbs.
Saltpetre 240 lbs and bonedust 360 lbs
Saltpetre 240 lbs and bone superphosphate 240 lbs.
Pondrette 180 maunds.
(b) Plots which bore wheat one year and maize every alternate year.
Manure and quantity applied per acre.
No manure.
Sheepdung 180 maunds.
Sheepdung 180 maunds and gypsum 240 lbs.
Sheepdung 180 maunds and bonedust 360 lbs.
Cowdung 180 maunds.
Cowdung 180 maunds and gypsum 240 lbs.
Cowdung 180 maunds and bonedust 360 lbs.
Ashes of 180 maunds cowdung.
Ashes of 180 maunds cowdung and saltpetre 240 lbs
Saltpetre 240 lbs.
Saltpetre 240 lbs and bonedust 360 lbs.
Saltpetre 240 lbs and bone superphosphate 240 lbs
Pondrette 180 maunds.
Series II. Green soiling.
Manure and quantity per acre.
No manure.
Indigo crop ploughed in
Indigo crop ploughed in and gypsum 6 maunds.
Indigo roots and fallen leaves after removal of the crop.
Old indigo refuse 120 maunds.
Fresh indigo refuse 120 maunds and lime 6 maunds
Indigo water 3,600 cubic feet
Hemp ploughed in
Hemp ploughed in and gypsum 6 maunds.
Roots and leaves of hemp after removal of the crop.
Hemp water 3,600 cubic feet.
Root of lucerne after removal of the crop.
Series III.—Miscellaneous.
Manure and quantity per acre
No manure.
Brick kiln refuse 120 maunds
Silt 350 maunds.
Compost 200 maunds.
Road scraping 300 maunds
Ashes of 180 maunds weeds.
Ashes of 180 maunds weeds saltpetre 240 lbs
Ammonic chloride 240 lbs
Series IV Ploughing
Ploughed 5" deep.
Ploughed 9" deep.
Grain
Straw
5
10
15
20
25
30
35
40
45

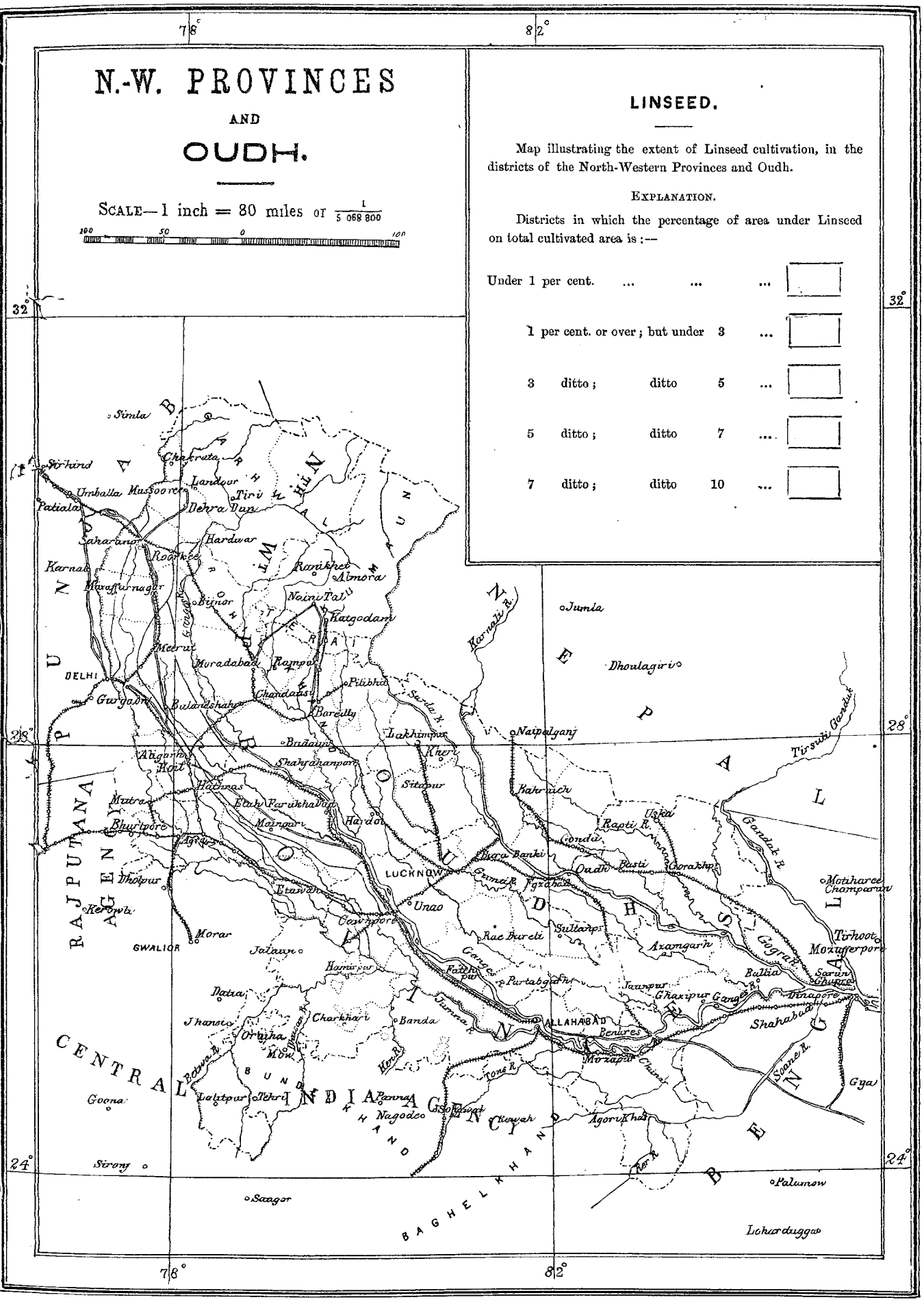

N.-W. PROVINCES
AND
OUDH.
SCALE—1 inch = 80 miles or 1/5 068 800
100 50 0 100
MAIZE.
Map illustrating the extent of Maize cultivation, in the districts of the North-Western Provinces and Oudh.
EXPLANATION.
Districts in which the percentage of area under Maize on total cultivated area is:—
Under 1 per cent. ... ... ...
1 per cent. or over; but under 3 ...
3 ditto; ditto 5 ...
5 ditto; ditto 10 ...
10 ditto; ditto 20 ...
78°
82°
32°
28°
24°
Simla
Sirhind
Umballa
Patiala
Kurnal
Saharunpur
Roorkee
Hardwar
Dehra Dun
Landour
Tiri
Mussooree
Chakrata
Moradabad
Meerut
Bijnor
Ramgodam
Ranikhet
Almora
Kaini Pall
Pilibhit
Bareilly
Shahjahanpore
Budaun
Futtehgurh
Mynpoory
Etawah
Etah
Furrukhabad
Mynpoory
Hardoi
Seetapur
Lucknow
Unao
Cawnpore
Rae Bareli
Sultanpur
Fyzabad
Gonda
Bulrampur
Oudh
Rapti R.
Basti
Gorakhpur
Jumla
Dhoulagiri
Naipulganj
Kahraich
Tirsuli Gandak
Gunduk R.
Motiharee
Champarun
Tirhoot
Muzzufferpore
Sarun
Chupra
Azamgurh
Gugra R.
Ghazipur
Ghazipore
Buxar
Shahabad
Benares
Allahabad
Jaunpur
Mirzapur
Chunar
Banda
Hamirpur
Jalaun
Gwalior
Morar
Dholpur
Bhurtpore
Muttra
Delhi
Gurgaon
Bulundshahr
Aligurh
Hattras
Agra
Rajputana Agency
Central India Agency
Bundelkhand
Jhansi
Chirkharee
Lalitpur
Goona
Sirong
Saugor
Nagodeo
Rewah
Panna
Myhere
Jyorukhat
Palamow
Lohardugga
Gya
Soane R.
Ken R.
Betwa R.
Jumna R.
Ganges R.
Gumti R.
Gogra R.
Karnali R.
Sarda R.
Rhar
Baghelkhand

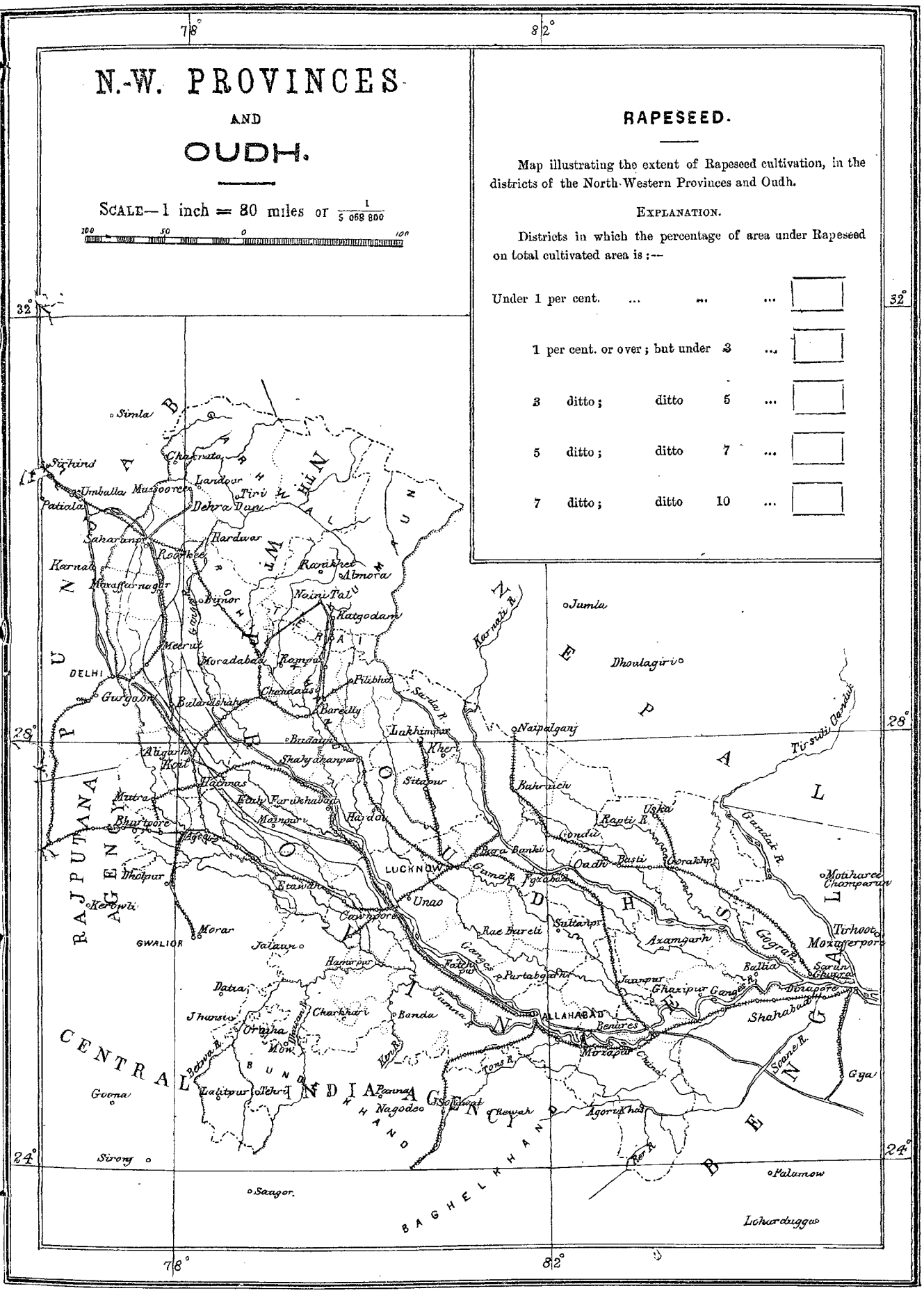
Appendix E.


N.-W. PROVINCES
AND
OUDH.
SCALE—1 inch = 80 miles or 1/5 068 800
100 50 0 100
PEAS.
Map illustrating the extent of Peas cultivation, in the districts of the North-Western Provinces and Oudh.
EXPLANATION.
Districts in which the percentage of area under Peas on total cultivated rea is :—
Under 1 per cent. ... ... ...
1 per cent. or over ; but under 3 ...
3 ditto ; ditto 5 ...
5 ditto ; ditto 10 ...
10 ditto ; ditto 20 ...
78°
82°
32°
28°
24°
Simla
Sirhind
Umballa
Patiala
Massooree
Landour
Tiri
Dehra Dun
Saharanpur
Hardwar
Roorkee
Karnal
Muzaffarnagar
Bijnor
Ranikhet
Almora
Naini Tal
Katgodam
Meerut
Moradabad
Rampur
DELHI
Gurgaon
Bulandshahr
Chandausi
Pilibhit
Bareilly
Budaun
Lakhimpur
Kheri
Aligarh
Koil
Shahjahanpur
Sitapur
Hathras
Etah
Farukhabad
Mainpuri
Hardoi
Mutra
Bhurtpore
Agra
Dholpur
Kerowli
Morar
GWALIOR
Etawah
LUCKNOW
Unao
Cawnpore
Jalaun
Hamirpur
Datia
Jhansi
Orniha
Mow
Chorkhari
Banda
Lalitpur
Tehri
Goona
Sirony
Saugor
Panna
Nagode
Rewah
Agori Khas
Jumla
Dhoulagiri
Naipalganj
Bahraich
Rapti R.
Uska
Gonda
Bara Banki
Oudh
Basti
Gorakhpur
Motiharee
Champarun
Tirhoot
Mozufferpore
Sultanpur
Rae Bareli
Azamgarh
Gograh
Ballia
Sarun
Ghupra
Dinapore
Jaunpur
Ghazipur
Ganges R.
Shahabad
Benares
Mirzapur
ALLAHABAD
Chinar
Soane R.
Gya
Palamow
Lohardugga
Tirsuli Gandak
Gandak R.
Karnali R.
Sarda R.
Jumna R.
Ganges R.
Betwa R.
Ken R.
Tons R.
Ror R.
PUNJAB
NEPAL
BENGAL
RAJPUTANA AGENCY
CENTRAL INDIA AGENCY
BUNDELKHAND
BAGHELKHAND
OUDH
PROVINCES


78°
82°
N.-W. PROVINCES
AND
OUDH.
SCALE—1 inch = 80 miles or 1/5 068 800
100 50 0 100
MANDUA AND KODON.
Map illustrating the extent of Mandua and Kodon cultivation, in the districts of the North-Western Provinces and Oudh.
EXPLANATION.
Districts in which the percentage of area under Mandua and Kodon on total cultivated area is:—
Under 1 per cent. ... ... ...
1 per cent. or over; but under 3 ...
3 ditto; ditto 5 ...
5 ditto; ditto 10 ...
10 ditto; ditto 20 ...
32°
28°
25°
24°
Simla
Sirhind
Chakrata
Landour
Umballa
Mussoorie
Tiri
Patiala
Dehra Dun
Saharanpur
Hardwar
Roorkee
Karnal
Muzaffarnagar
Ranikhet
Almora
Bijnor
Naini Tal
Katgodam
Meerut
Moradabad
Rampur
DELHI
Gurgaon
Bulandshahr
Pilibhit
Chandausi
Bareilly
Budaun
Lakhimpur
Kheri
Naipalganj
Jumla
Dhoulagiri
Tirsuli
Gurdiel
Abganga
Rori
Shahjehanpur
Sitapur
Habmau
Mutra
Bhurtpore
Mainpuri
Hardoi
Bahraich
Rapti R.
Utrau
Gonda
Agra
Dholpur
LUCKNOW
Unao
Oudh
Basti
Gorakhpur
Motiharee
Champarun
Etawah
Cawnpore
Rae Bareli
Sultanpur
Azamgarh
Tirhoot
Muzafferpore
GWALIOR
Morar
Jalaun
Humirpur
Fatehpur
Partabgarh
Jaunpur
Ghazipur
Ganges
Ballia
Dinapore
Saran
Chupra
Datia
Jhansi
Charkhari
Banda
ALLAHABAD
Benares
Shahabad
Orcha
Mow
Mirzapur
Chunar
Soane R.
Gya
Goona
Lalitpur
Tehri
Panna
Nagode
Chuwah
Agori Khas
Sirony
Palamow
Sauger
Lohurdugga
RAJPUTANA AGENCY
CENTRAL INDIA AGENCY
BUNDELKHAND
BAGHELKHAND
BENGAL
NORTH-WESTERN PROVINCES
OUDH
NEPAUL
HIMALAYAN MOUNTAINS
Kosilla R.
Ganges R.
Jumna R.
Betwa R.
Ken R.
Sone R.
Gunduk R.

Appendix E.


N.-W. PROVINCES
AND
OUDH.
SCALE—1 inch = 80 miles or 1/5 068 800
LINSEED.
Map illustrating the extent of Linseed cultivation, in the districts of the North-Western Provinces and Oudh.
EXPLANATION.
Districts in which the percentage of area under Linseed on total cultivated area is :—
Under 1 per cent. ... ... ...
1 per cent. or over ; but under 3 ...
3 ditto ; ditto 5 ...
5 ditto ; ditto 7 ...
7 ditto ; ditto 10 ...
78°
82°
32°
28°
24°
Simla
Sirhind
Umballa
Patiala
Mussoorie
Landour
Tiri
Dehra Dun
Saharanpur
Hardwar
Roorkee
Karnal
Muzaffarnagar
Bijnor
Ranikhet
Almora
Naini Tal
Katgodam
Meerut
Moradabad
Rampur
DELHI
Gurgaon
Bulandshahr
Chandausi
Pilibhit
Bareilly
Budaun
Lakhimpur
Kheri
Aligarh
Koil
Shahjahanpur
Sitapur
Hathras
Mutra
Etah
Farukhabad
Mainpuri
Hardoi
Bhurtpore
Agra
Dholpur
Kerowli
Etawah
LUCKNOW
Unao
Cawnpore
Morar
GWALIOR
Jalaun
Hamirpur
Datia
Jhansi
Charkhari
Banda
Orniha
Mow
Lalitpur
Tehri
Goona
Sirony
Saugor
Panna
Nagode
Rewah
Agori Khas
Jumla
Dhoulagiri
Naipalganj
Bahraich
Gonda
Rapti R.
Uska
Basti
Gorakhpur
Oudh
Fyzabad
Rae Bareli
Sultanpur
Azamgarh
Jaunpur
Ghazipur
Ballia
Gogra R.
Gandak R.
Tirsuli Gandak
Motiharee Champaran
Tirhoot
Mozufferpore
Sarun
Ghazipur
Dinapore
Shahabad
Gya
Soane R.
Ganges R.
Jumna R.
Ken R.
Tons R.
Chinat
Rer R.
ALLAHABAD
Benares
Mirzapur
Fatehpur
Partabgarh
Karnali R.
Sarda R.
Gumti R.
Betwa R.
Dhasan R.
Ganges R.
Jumna R.
Chinat
Rer R.
Palamow
Lohardugga
RAJPUTANA AGENCY
CENTRAL INDIA AGENCY
BUNDELKHAND
BAGHELKHAND
NEPAL
BENGAL
OUDH
ROHILKHAND
TERAI
GARHWAL
KUMAUN
PUNJAB
NEPAL


N.-W. PROVINCES
AND
OUDH.
SCALE—1 inch = 80 miles or 1/5 068 800
100 50 0 100
RAPESEED.
Map illustrating the extent of Rapeseed cultivation, in the districts of the North-Western Provinces and Oudh.
EXPLANATION.
Districts in which the percentage of area under Rapeseed on total cultivated area is :—
Under 1 per cent. ... ... ...
1 per cent. or over; but under 3 ...
3 ditto; ditto 5 ...
5 ditto; ditto 7 ...
7 ditto; ditto 10 ...
78°
82°
32°
28°
24°
Simla
Sichind
Umballa
Mussooree
Patiala
Landour
Tiri
Dehra Dun
Chakruta
Saharanpur
Roorkee
Hardwar
Kernal
Muzaffernagur
Bijnor
Ranikhet
Almora
Naini Tal
Kotgodam
Meerut
Moradabad
Rampur
DELHI
Gurgaon
Bulandshahr
Chandausi
Pilibhit
Bareilly
Budaun
Aligarh
Kosi
Shahjahanpur
Mathras
Kuch Farukhabad
Mainpur
Hardoi
Mutra
Bhurtpore
Agra
Dholpur
Etawah
LUCKNOW
Unao
Cawnpore
Morar
GWALIOR
Jalaun
Hamirpur
Fattehpur
Rae Bareli
Sultanpur
Partabgarh
Lakhimpur
Kheri
Sitapur
Jumla
Dhoulagiri
Naipalgunj
Bahraich
Utraula
Gonda
Ekora Banki
Oudh
Basti
Gorakhpur
Ramti R.
Gunduk R.
Tirsuli Gandak
Motiharee Champaran
Torhoot
Mozafferpore
Axamgarh
Jaunpur
Ghazipur
Ganges
Benares
Mirzapur
Chunar
Shahabad
Saran
Chuprah
Sone R.
Gya
Patna
Jhansi
Charkhari
Banda
Orcha
Datia
Goona
Lalitpur
Tehri
Nagode
Chowar
Agori Khas
Sirony
Saugor
Palamow
Lohardugga
RAJPUTANA AGENCY
CENTRAL INDIA AGENCY
BUNDELKHAND
BAGHELKHAND
HIMALAYA MOUNTAINS
NEPAUL
OUDH
DOAB
ROHILCUND
BENGAL

# ORDERS OF GOVERNMENT.

No. $\frac{721}{I-218}$ OF 1890.

FROM

THE CHIEF SECRETARY TO GOVERNMENT,

N.-W. PROVINCES AND OUDH,

To

THE DIRECTOR OF LAND RECORDS AND AGRICULTURE,

N.-W. PROVINCES AND OUDH.

DATED NAINI TAL, THE 8TH MAY 1890.

SIR,

REVENUE DEPT.

I AM directed to acknowledge the receipt, on 21st February last, of your annual report on the administration of the Department of Land Records and Agriculture for the year ending 30th September 1889.

2. The section relating to the maintenance of village records is no longer included in the report, as it is now submitted separately to the Board of Revenue and the Oudh Revenue Department for incorporation in the Revenue Administration Report of the Provinces.

3. The statistical analysis of districts by means of the mahál and mauza registers and the pargana book is said to be proceeding steadily. You do not, however, appear to be satisfied that sufficient attention is devoted to the systematic examination of the pargana book by District Officers on tour, and although you allow that want of time and the pressure of urgent duties doubtless stand in the way of the full observance of the rules for the maintenance of this very important register, you are nevertheless of the opinion that the rules might be complied with somewhat more fully than they are at present. A careful study of the information the pargana book contains is essential to a sound and well-informed direction of the revenue work of a district, and a record invaluable for the guidance of successive Collectors must not be suffered to fall into neglect. The attention of all District Officers will be drawn to the matter.

4. Among measures of protection a passing reference is made to the reclamation of waste lands in Jhánsi by means of a series of embankments, which it is hoped may stop the denudation of the hills and encourage the deposit of fertilizing silt. The more important of these projects consists of a series of 30 bands at Raksha, and in the construction of these steady progress has been made. Owing to the somewhat deficient rainfall of the past year these bands have not as yet been severely tested. In February last, the works were inspected by the Lieutenant-Governor in company with the Commissioner of Jhánsi and the Executive Engineer in charge of the work. It was clear that the results of the effect of the ensuing rains on the works which have been completed must be awaited, and a further report by the Executive Engineer after the next rainy season will be submitted.

5. Experiments connected with the reclamation of waste usar land have been continued, and Appendix C of your report gives details of each of the several plots which are under observation and experimental treatment, both by the Irrigation Department and by your own. It is clear, and the Lieutenant-Governor learns it with regret, that from a financial point of view the majority of these experiments have not been successful. In some cases they have finally failed, and in others, although the usar tracts have been fertilized and brought under cultivation, the expenditure incurred has been out of proportion to the improvement achieved. It was probable that sustained trenching, manuring and watering would make barren soil fit for cultivation, but no substantial advantage has been gained unless the money value of the improvement is greater than its cost. In one case only have details been given of the expenditure on the experiment, and I am to ask that you will furnish an account of the expenses incurred, so that an idea may be formed of the actual cost per acre of reclamation in each of the different experiments. The most successful results have been at Amramau, and I am to acknowledge the resource and care with which the Assistant Director, Mír Muhammad Husain, has initiated and carried out the operations there. His system of enclosure and gradual cultivation has, you say, commended itself to practical neighbours, and I am to suggest that further experiment on the same lines be made, if similar supervision of them be possible, in the tracts where other methods have failed. I am to convey sanction to your proposal to sell the portion of the Amramau lands which has been finally reclaimed.

6. The expenditure on arboriculture has decreased by Rs. 3,962 in the year under review, while the income has increased from Rs. 32,890 to Rs. 47,084. The deficit on the year's operations amounted to Rs. 19,905 only as compared with Rs. 38,061 in the previous year, an improvement mainly due to judicious felling of old and decaying trees. You again suggest that the District Boards should be allowed to retain the excess of their revenue under this head over their expenditure, but I am to refer you to the orders on the departmental report for 1887-88, in which the proposal was disallowed because the majority of districts do not pay their way and had to be subsidized by Government. For the year under report the two divisions of Meerut and Rohilkhand alone show receipts in excess of the expenditure. In the Sitapur Division the receipts amounted only to Rs. 447 against an expenditure of Rs. 2,365. In no fewer than 11 districts, excluding hill districts, the receipts on account of the sale of fruit and grass are under Rs. 50, whereas Moradabad shows receipts of Rs. 1,079. The receipts under the head of lopping and felling exceeded Rs. 4,000 in one district, Rs. 3,000 in two districts, Rs. 2,000 in four districts, Rs. 1,000 in two districts, Rs. 500 in 10 districts, Rs. 100 in 19 districts, and were under Rs. 100 in eight districts.

Planting, pruning and thinning are generally done at intervals, and operations on a great length of avenue will suddenly increase the outlay or the income of a district, as the case may be, but variations

so great as the above should receive explanation. I am to commend cordially your remarks as to securing the co-operation of the local landowners in the extension of roadside avenues, a direction in which great assistance has been repeatedly obtained.

7. The chief results of the year's experiments at the Cawnpore Farm are reported to be—

(1) that a mixture of saltpetre and bone-dust gave more produce than any other fertilizer tried;

(2) that the yield of fields in which maize is alternated with wheat is greater than that of similarly manured fields in which wheat is grown each year.

The latter is in accord with very elementary principles of Western agriculture, and the value of the former is unfortunately minimized by the conclusions to which your inquiries have led [paragraph 32 (*d*) of the report], that the cost of bone-dust compared with other manures is such as to prohibit its use by the cultivator of these Provinces. The Lieutenant-Governor has however read with interest the praise given to this Farm by so capable a judge as Dr. Völcker, for the precision and completeness with which its experiments have been worked out, and he has no doubt that it serves a useful purpose in spreading throughout the country methods of agriculture, which were confined to particular tracts, and above all in distributing purer and better seed. The rapidly increasing demand for seed wheat and oats, is very noticeable, and the Lieutenant-Governor observes with pleasure the good work done by the several private farms mentioned in paragraph 12 of the report in this and other matters. I am to request that you will in particular convey the acknowledgments and thanks of the Lieutenant-Governor to Chaudhri Said-ud-din of Khera, Rae Bahadur Chaudhri Debi Singh of Araura, Kuar Karan Singh of Jator and Mahtab Roy of Meerut for the intelligent and active interest they have taken in the improvement of husbandry.

8. The Assistant Director has contributed a note containing very useful suggestions for the management of district agricultural shows, to which the attention of District Officers will be drawn.

9. The table appended to paragraph 20 of the report shows a marked decrease in the sale and distribution of agricultural implements. This is due to cash payments having been insisted on before the articles were delivered. It is explained that implements were not unfrequently given away gratis, or lent on trial, or sold on long credit, with the result that there were heavy outstandings for unpaid bills, and the rule now adopted by the Department requiring prepayment appears to be in every way expedient.

10. Although no meeting of the Agricultural Association was held during the year, the members are said to have rendered useful assistance to the Department, particularly in furnishing forecasts of crops, and the thanks of Government should be conveyed to them for their services.

11. The improvements made in the arrangement for registration of traffic with a view to secure the early publication of the returns; the additions to the Provincial Museum and its library; and the hopeful source of industry opened up in Lucknow muslins, in which the workers are for the most part *pardah-nashin* women, are noticed with satisfaction by the Lieutenant-Governor.

12. In conclusion, I am to acknowledge the very interesting account in paragraph 32 of your report on the subject of the export of bones to Europe and the thoroughness with which the matter has been examined and described; and to thank you for the care and lucidity with which the report as a whole has been prepared.

I have the honor to be,

SIR,

Your most obedient servant,

J. WOODBURN,

*Chief Secy. to Govt., N.-W. P. and Oudh.*

# REPORT ON THE OPERATIONS

OF THE

# DEPT. OF LAND RECORDS AND AGRICULTURE

## NORTH-WESTERN PROVINCES AND OUDH,

FOR THE YEAR ENDING 30TH SEPTEMBER 1890.

ALLAHABAD:

NORTH-WESTERN PROVINCES AND OUDH GOVERNMENT PRESS.

1891.

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# REPORT ON THE OPERATIONS

OF THE

# DEPT. OF LAND RECORDS AND AGRICULTURE,

## NORTH-WESTERN PROVINCES AND OUDH,

## For the year ending 30th September, 1890.

No. 39S OF 1891.

FROM

T. W. HOLDERNESS, ESQ., *C.S.*,

DIR., DEPT. OF LAND RECORDS AND AGRICULTURE,

N.-W. PROVINCES AND OUDH,

To

THE CHIEF SECRETARY TO GOVERNMENT,

N.-W. PROVINCES AND OUDH.

*Dated Cawnpore, the 19th January* 1891.

SIR,

I have the honor to submit the annual report on the work of this Department for the year 1889-90.

### SECTION I.

#### MAINTENANCE OF VILLAGE RECORDS.

2. This section of the report is, in accordance with the orders of Government, submitted separately to the Board of Revenue and to the Oudh Revenue Department for the Provinces of the North-Western Provinces and Oudh respectively, and is embodied in the Revenue Administration Report for the year. The result of this arrangement is that the subject which occupies at least three-fourths of the Director's time finds no place in the annual report. I have no doubt that the advantages of this arrangement are greater than the drawbacks, but it places me at the time of writing this report in the position of a person who has to put on the stage a piece from which the principal character has been struck out. I hope therefore to be permitted to indicate very briefly what has been done during the year to maintain and perfect the elaborate system of land records which has been built up in these provinces by Settlement and District Officers. With the surplus funds obtained by the imposition of the patwári rate the salaries of patwári establishment in the Benares Division have been substantially improved, and additional kanúngos provided. The details of this reform were worked out by me in the course of a tour through the districts concerned. In other Divisions revisions of patwáris' circles and salaries have been pushed on, and little more now remains to be done in this direction. In Azamgarh measures have been taken to improve the accuracy of the rental entries in the village records, and rules on this point applying to the whole of the Benares Division have recently been issued. The records maintained by the patwáris throughout the province have been altered in some important respects with the object of decreasing their bulk and improving their statistical

utility. The system of reporting transfers of proprietary rights has been examined and modified. The patwári school rules have been revised, as have also those regarding the important though hitherto much neglected register, the pargana-book. Nearly every district in the two provinces has been inspected and reported on by the Director or Assistant Director or one of the Inspectors attached to the Department. The Inspectors, of whom there are six, are now well trained in their duties, and are employed throughout the year in minutely examining the work of kanúngos and patwáris, correcting errors of procedure, and bringing defects and shortcomings to the notice of the district authorities. The standard of excellence naturally varies in different districts, and in no district is the village record staff as competent as it should be. But I think there is a general concensus of opinion among District Officers that during the last ten years the accuracy of the records has sensibly improved. The rapidity with which revision of settlement has been made in the districts of Bulandshahr, Saháranpur and Muzaffarnagar is a proof that the money and care now expended on the kanúngo and patwári staff have not been thrown away.

## SECTION II.

### Analysis of Districts.

3. In continuation of the series of statistical maps appended to the report for last year, a further series is now given showing the distribution of urd and múng, moth, juar fodder, guar, kurthi, hemp, til, masur, and tobacco. The maps of hemp and til are based on the average of the last two years, statistics for previous years not being available for these crops. The other maps are based on ten years' averages.

4. Under this section in the report for 1888-89, I referred to the systematic analysis of districts which is steadily progressing in each revenue sub-division by means of the ledgers known as mahál and mauza registers and pargana-books, and I drew attention to the general failure on the part of District Officers to comply with the rules prescribed by Government for the examination of and entry of notes in the pargana-books. These remarks have led to the issue of orders by the Board of Revenue and the Government which, it is hoped, will lead to improvement in the present state of things. The present form of the pargana-book is said by some officers to be defective, and proposals have been made to substitute for it a more elaborate register. The objection to such proposals is that the kanúngo staff is already overworked and that any further elaboration of statistics is undesirable. It is further to be remarked that the pargana-book was not meant to be an exhaustive repertory of village statistics, but a permanent note-book in which the results of personal inquiries by the district staff were to be recorded. The figures annually entered in it by the kanúngos are merely the leading statistics of each village, and are meant to suggest inquiry, and not in themselves to present a complete and true picture of the economic condition of the village. Figures, however elaborate, do not carry their own message. They require to be interpreted by an intelligent mind and supplemented by knowledge which cannot be expressed in a tabular form. The pargana-book will not be useful until it is properly annotated by sub-divisional officers, and to condemn it in its present state is equivalent to condemning an implement which has not been made in accordance with the inventor's pattern.

## SECTION III.

### System of collection of Revenue and Rental in precarious Tracts.

*Nil.*

## SECTION IV.

### Measures of Protection, including Arboriculture.

5. **Reclamation of waste lands, Jhansi.**—I have nothing to add to the information regarding this experiment given in last year's report. Expenditure on original

works is closed, and the maintenance of such embankments as have been constructed has now been made over to the Irrigation Branch of the Public Works Department.

6. **Reclamation of Usar land.**—The experiments which were described in last year's report are still in progress, and there is little to add to what was said last year. The chief facts regarding each plot are given in the usual appendix. The first six plots are under the management of the Irrigation Department, as they adjoin canal distributaries. The four plots under the control of the Agricultural Department are, (1) the Juhi, and Amramau plots in the Cawnpore district; and (2) the Gursikran and Cherat plots in the Aligarh district. The Juhi plot, measuring 102 acres, has now been under observation for eight years. It was originally a plot of bare *úsar* land, within two miles of Cawnpore, and was acquired at the cost of one rupee an acre. Including this the total cost up to date is Rs. 2,179. Fencing with posts and pillars and ditching cost nearly Rs. 1,000, and tree planting and watering, wages of the chaukidár, &c., make up the rest. The theory of the experiment was that by means of simple enclosure for five or six years the soil would be so improved that an annual revenue from sale of grass of Rs. 100 per annum from the 100 acres would be obtained. It was also hoped that *babul* and other hardy trees would eventually spring up, and that in time a fuel and fodder reserve would be formed at little cost. The results have been disappointing. Enclosure has unquestionably induced a vigorous growth of grass, and the grasses are slowly improving in quality. But the staple grass is still the common *úsar* grass which dies down after the rains, and which though largely eaten by the animals, is not nourishing. As to trees, the numerous sowings which have been made have for the most part ended in failure, and those plants which have struggled into existence are stunted and slow growing. The first receipts were obtained this year, as a portion of the area was let to a grazier at the end of the rains for Rs. 50. Next year the plan of cutting the grass and stacking it as hay for sale in December and January will be tried. Whether or not the experiment prove eventually remunerative, it would be a mistake to abandon it. The annual expenditure is very trifling, and it is very desirable for scientific purposes that changes in the character of soil regarded as unculturable, resulting from simple enclosure, should continue to be observed.

7. The Amramau plot, consisting of 52 acres, adjoins Juhi, and was also taken up eight years ago. It was fenced in and originally treated in the same way as Juhi, but in 1885 the Assistant Director was allowed to try the experiment of manuring and deep ploughing. The total expenditure and receipts are shown in the margin. 35 acres have been reclaimed, of which 25 are let to tenants for Rs. 196 a year, and 10 acres are still under direct management. Against the difference of Rs. 1,983 shown in these accounts is to be set the value of the improved plot, of the wire fencing, and of the substantial farm buildings. The Assistant Director also argues, and with force, that the total expenditure includes charges incurred in the first three years in attempting to form a fuel and fodder reserve. The plot will be sold as soon as a pending question as to the future supply of canal water has been settled. The system of canal distributaries around Cawnpore has lately been revised, and the value of Amramau is entirely dependent upon its being able to continue to obtain canal water.

| | Rs. | Rs. |
|---|---|---|
| Total expenditure up to 30th September 1890 ... ... | | 8,558 |
| Cash receipts from sale of milk, cattle, grain, and from rent ... ... | 3,856 | |
| Recoverable outstandings ... ... | 460 | |
| Value of live stock and grain; and farm implements ... ... ... | 2,259 | |
| | | 6,575 |
| Difference ... | | 1,983 |

8. Near Aligarh there are two *úsar* plots, one at Cherat and the other at Gursikran. Gursikran, containing 960 acres, is for the most part managed like Juhi, with the object of forming a fuel and fodder reserve. A small portion has been broken up and let to tenants. The expenditure up to date is Rs. 5,197 and the receipts

Rs. 2,116. As at Juhi, there is now a vigorous growth of *úsar* grass, but hitherto it has been difficult to find a market for it.

9. The Cherat *úsar*, consisting of 242 acres, was originally maintained as a fuel and fodder reserve, and numerous tree planting experiments were tried. It has now been divided into two portions, one of which is kept under grass and the other is being brought under cultivation by manuring and deep ploughing. The total expenditure on the fuel and fodder reserve experiment has been Rs. 3,941 : on the tillage reclamation experiment, Rs. 4,543. The latter includes the purchase of cows and bullocks and the building of large farm buildings and cattle sheds. A summary of accounts of the tillage experiment is given in the margin. About 20 acres have been successfully brought under the plough, and next rains 30 or 40 more will be broken up. The live stock includes cows and calves. The herd is kept to secure manure, and will more than pay its way by sale of milk and butter and of young stock. The cows were carefully selected in Hissar. The neighbouring zamíndárs at one time scoffed at the idea that the *úsar* could be made to yield a blade of corn. The reclaimed fields can now be let for Rs. 4 and Rs. 5 the pakka bigha, and the farm has often interested visitors. I consider this one of the most important and hopeful experiments we have on hand. The Cherat *úsar* is situated in a *reh* infected tract, and under the influence of a raised water-level (due in all probability to the canal) and a miserable system of cultivation, *reh* is steadily spreading in the neighbourhood. The Cherat *úsar* when the department took it over was thick in many places with a saline deposit. If by means of deep ploughing and manure we can keep the salts down, we shall have illustrated the views expressed by Mr. Medlicott, the late head of the Geological Survey, at the *reh* conference of 1878, that deep cultivation, by loosening the sub-soil, enables the salts to escape when in solution to the under-ground waters. The progress of *reh* is the most serious agricultural danger of the canal districts of these provinces, and any thing that throws light on the problem is of importance.

| | Rs. | Rs. |
|---|---|---|
| Total expenditure ... ... | | 4,543 |
| Receipts from rents, sale of milk, grain and stock ... ... ... | 876 | |
| Present value of live stock and implements ... ... ... | 1,927 | 2,803 |
| Difference ... | | 1,740 |

10. **Arboriculture.**—The total charges amounted to Rs. 71,313, or Rs. 4,324 in excess of the previous year. More than three-fourths of this amount was spent on avenues and the remainder on nurseries, groves and on lopping and felling trees. The receipts were estimated at Rs. 39,000, but the actuals amounted to Rs. 46,834, of which Rs. 33,788 was derived from loppings and fellings and Rs. 12,672 from sale of fruits and grass. The latter, compared with 1888-89, shows a decrease of Rs. 250. The receipts of the Meerut, Bulandshahr, Pilibhít, Cawnpore, Jaunpur, Benares, Hardoi, Bijnor, Moradabad and Partábgarh districts more than cover the expenditure incurred in them.

11. The following table shows the expenditure and receipts of each division during the year. A statement showing the receipts and charges in each district for six years is given in Appendix B. To this latter statement the attention of District Officers may usefully be directed, as it shows how much more is realised from arboriculture in some districts than in others. It is not to be expected that the large receipts obtained in the districts of the Meerut Division are obtainable in every district, but improvement on the present figures is in many cases possible. In the Rae Bareli district the receipts for the last six years average only Rs. 106, while the adjoining districts of Partábgarh and Sultánpur show Rs. 318 and Rs. 564 respectively. Etáwah has an average of only Rs. 247, though the district average of the division exceeds Rs. 800.

| Division. | Receipts. | | | Charges. | | | |
|---|---|---|---|---|---|---|---|
| | Loppings and fellings. | Fruits and grass. | Total. | Avenues. | Groves and nurseries. | Loppings and fellings. | Total. |
| | Rs. | Rs. | Rs. | Rs. | Rs. | Rs. | Rs. |
| Meerut ... ... | 13,431 | 701 | 14,132 | 12,037 | 2,173 | 273 | 14,483 |
| Agra ... ... | 4,485 | 1,904 | 6,389 | 8,384 | 1,816 | 180 | 10,380 |
| Rohilkhand... ... | 3,442 | 4,160 | 7,602 | 6,950 | 695 | 7 | 7,652 |
| Allahabad ... ... | 5,189 | 976 | 6,165 | 8,244 | 2,429 | 380 | 11,053 |
| Benares ... ... | 1,910 | 2,608 | 4,518 | 4,617 | 1,110 | 356 | 6,083 |
| Jhánsi ... ... | 495 | 379 | 874 | 8,702 | 868 | 30 | 9,600 |
| Kumaun ... ... | ... | ... | ... | 208 | 858 | ... | 1,066 |
| Lucknow ... ... | 1,311 | 926 | 2,237 | 2,291 | 1,417 | 94 | 3,802 |
| Sitapur ... ... | 1,614 | 165 | 1,779 | 1,832 | 683 | 129 | 2,644 |
| Fyzabad ... ... | 1,158 | 463 | 1,621 | 1,906 | 275 | 25 | 2,206 |
| Rae Bareli ... ... | 753 | 390 | 1,143 | 1,966 | 344 | 34 | 2,344 |
| Amount transferred by Accountant-General from Public Works Department. | ... | ... | 374 | ... | ... | ... | ... |
| Total ... | 33,788 | 12,672 | 46,834 | 57,137 | 12,668 | 1,508 | 71,313 |

12. The total length of roads under avenues at the close of 1888-89 was 4,583 miles to which 316 miles were added during the year under report, making a total of 4,899 miles. The largest additions were in the districts of Bara Banki, Lalitpur, Moradabad, Jaunpur and Gorakhpur.

13. The number of miles under avenues and the number of trees planted in each division during 1889-90 were as follow :—

| Division. | Length of avenues under operation during 188990.- | Total length of avenues at the end of 1888-89. | Length of avenues planted during 1889-90. | Total length of avenues at the end of 1889-90. | Total number of trees planted during 1889-90. |
|---|---|---|---|---|---|
| | Miles. | Miles. | Miles. | Miles. | Miles. |
| Meerut ... ... | 423 | 484 | 17 | 501 | 15,474 |
| Agra ... ... | 393 | 467 | 15 | 482 | 13,185 |
| Rohilkhand ... ... | 469 | 827 | 55 | 882 | 9,598 |
| Allahabad ... ... | 540 | 683 | 33 | 716 | 11,704 |
| Benares ... ... | 324 | 647 | 46 | 693 | 11,200 |
| Jhánsi ... ... | 352 | 335 | 48 | 383 | 6,376 |
| Kumaun ... ... | 31 | 69 | ... | 69 | 831 |
| Lucknow ... ... | 136 | 326 | 70 | 396 | 8,873 |
| Sitapur ... ... | 321 | 220 | 7 | 227 | 3,382 |
| Fyzabad ... ... | 218 | 344 | 19 | 363 | 4,754 |
| Rae Bareli ... ... | 74 | 181 | 6 | 187 | 1,695 |
| Total ... | 3,281 | 4,583 | 316 | 4,899 | 87,072 |

14. The number of miles planted in previous years and under operation in 1889-90 was 2,965, showing a decrease of 336 miles as compared with 1888-89. But the number of miles planted with trees in 1889-90 shows an increase of 47 miles, making the total number of miles under operation during the year under report 3,281 against 3,570 miles in the preceding year.

15. The operations in the Aligarh, Meerut, Muttra, Mainpuri, Agra, Etáwah, Etah, Bánda, Pilibhít, Allahabad, Fatehpur, Mirzapur, Benares, Gházipur, Jalaun, Lucknow, Unao, Sitapur, Kheri, Fyzabad and Rae Bareli districts were mainly confined to maintenance of avenues planted in previous years.

16. The number of trees planted in 1889-90 was 87,072 against 87,063 of 1888-89. The total expenditure was Rs. 57,137 against Rs. 53,008 in the preceding year; about two-thirds of which amount was spent in maintaining avenues planted in previous years, and the remainder in planting trees on new roads.

17. In the districts of Benares, Jaunpur, Fatehpur, Bánda, Cawnpore, Bijnor, Etáwah, Hardoi and Bara Banki land owners and tenants are reported to have taken an interest in planting trees and maintaining avenues on public roads.

18. The number of groves in 1889-90 was 75, against 71 of 1888-89. This shows an increase of four groves; but the area under groves shows a decrease of eight acres as compared with the figures of 1888-89. The expenditure was Rs. 2,373, against Rs. 2,222 in the preceding year.

19. The number of trees left in the nurseries at the close of the year 1888-89 was 3,01,418, to which 1,53,330 were added during the year, making a total of 4,54,748 trees. Of these 1,46,250 were planted out during the year, leaving a balance of 3,08,498 at the close of the year. The number of nurseries maintained was 197 against 189 during previous year. The expenditure under this head was Rs. 10,295, showing an increase of Rs. 410 against 1888-89.

## SECTION V.

### Agriculture, including Experimental Farms.

20. **Cawnpore Experimental Station.**—No changes occurred in the area of the farm nor in the nature and the number of the experiments: but as the term of some of the experiments has now expired some change will now be made. It is intended to reduce the number of the experiments, and more attention will be paid to producing selected seed for distribution.

21. At the suggestion of Dr. Vöelcker, the forms of the tabular statements appended to the annual report of the farm have been revised. Intricate calculations have been done away with, and to confirm the result of the year's experiments the average of past years are now given in each case.

The chief points aimed at by the experiments are—

(*a*) To estimate the utility of improved methods of farming compared with indigenous methods.

(*b*) To utilize the farm as a gauge to the character of seasons.

(*c*) To produce selected seed for distribution in the country.

The experiments may be classed in two groups :—

I.—Permanent—

(*a*) Kharíf, (*b*) rabi.

II.—Temporary—

(*a*) Kharíf, (*b*) rabi.

The permanent kharíf and rabi experiments are 3 and 8 in number, and the temporary 8 and 7 respectively.

The season of 1889-90 was favourable both for kharíf and rabi. The rains were opportune, and canal water supply was regular throughout the year.

22. Under the manure experiments poudrette, sheep-dung and bone-dust, sheep-dung and gypsum, and plain cow-dung have again proved to be the best general manures for maize. Woollen refuse is best of all, but it is special to a manufacturing centre like Cawnpore, where the waste of mills is procurable. Maize sown on ridges in the American fashion for the first time beat the country sown crop. Early sown maize irrigated up to the rains also gave good results. In cotton experiments woollen refuse proved an excellent fertilizer. Fresh cotton seed was procured from America and tried. Of the varieties thus procured S. B. Mexey gave very good results. Garo Hill, Sea Island and Egyptian seed also did well, and were comparatively free from the fungoid disease which attacked the country crop.

23. With regard to sugarcane experiments the practice on the farm is to sow only the top pieces of the cane, whereas in most of the eastern districts the wasteful practice of using the whole of the cane prevails. The season was very good for sugarcane, and

the yield was large. Successful results were obtained by taking a second crop of cane from the roots of the last year's crop, as the yield was very good.

24. The rabi season experiments are chiefly restricted to wheat, which was sown in about 18 acres. The total yield was about 311·5 maunds, the average yield being 17·5 maunds or 22 bushels the acre. The highest yield of any plot reached 45½ bushels per acre. This is an exceptional yield for any plot on the farm in any past year. The chief results of the rabi experiments are as follow: Wheat following maize in rotation gives better results than wheat grown year after year without change. Cow-dung with bone-dust, saltpetre with bone-dust, sheep-dung and poudrette proved the best manures. Among green manures indigo proved more beneficial than hemp: and indigo preceding wheat as an ordinary crop is also proved to benefit the land.

The ploughing experiments again demonstrated the utility of deep ploughing.

The yields of a number of varieties of wheat, Indian, English and acclimatized, were carefully tested. Muzaffarnagar wheat on the whole gave the best results. English wheats as usual did not do well. The result of experiments with four varieties of barley was in favour of the ordinary country seed.

25. The Assistant Director remained in charge of the farm throughout the year. It was visited several times by Dr. Voëlcker, who was satisfied with the management. It is often visited by native gentlemen coming to Cawnpore on business or residing in the neighbourhood.

26. **Private Farms.**—Amongst those worked throughout the year may be noted—

(1) *The Lyall Farm, Ajhauli.*—Owned by Chaudhari Said-ud-din of Khera, Budaun.

(2) *The Demonstration Farm, Meerut.*—Managed by Rai Bahádur Chaudhari Debi Singh of Asoura, Meerut.

(3) *The Jatao Farm.*—The property of Kuar Karan Singh of Jatao, tahsíl Firozabad, Agra.

(4) *Babu Lachman Parshad's Farm at Cawnpore.*—This covers an area of 165 acres and is conducted by my Personal Assistant at his own risk in a most intelligent and praiseworthy manner.

(5) *The Jamnapár Agricultural Association.*—This association has no farm of its own, but the members conduct experiments on their own lands and report the results.

I have inspected Nos. (1) and (2) and consider the management creditable to the gentlemen who have voluntarily undertaken the risk and trouble of carrying on these institutions. The Jatao farm in the Agra district is also well reported on by the Assistant Director, but I have not had an opportunity of seeing it.

27. **Saharanpur Gardens.**—The rains of 1889 were heavy and ill-distributed. The cold weather of 1889-90 was extremely dry and generally mild, though a few days of severe frost occurred. On the whole the season was not unfavourable. The financial result of the gardens was most satisfactory. The total receipts amounted to Rs. 21,048, of which Rs. 2,319-1-0 represents the value of seeds and plants supplied to soldiers' gardens, leaving net cash receipts of Rs. 18,728-15-0 against Rs. 16,120-2-6 in 1888-89. This excludes the value of seeds and plants gratuitously supplied to public gardens and societies in India and elsewhere. The expenditure amounted to Rs. 20,403-11-9, or Rs. 1,494 in excess of that of the former year.

The buildings are in good substantial repair, and useful additions have been made to the plant and seedling houses. The gardens are well and carefully kept.

28. It may be noted that by the transfer of Mr. Duthie to the Government of India, the present object of the gardens is somewhat different from what it was at first. Originally the gardens were intended for botanical research and scientific observation. They are now plant and seed nurseries on a large scale, the cultivation of exotic species and varieties being mainly confined to fruit bearing trees and edible plants. During the last three years the distribution of flower and vegetable seeds to the public has nearly doubled. Sales of fruit trees and ornamental shrubs have also considerably increased. Great attention is paid to the cultivation of acclimatized vegetable and flower seeds, to keeping up the stock of grafts and to increasing the varieties of peaches, oranges, mangoes and other fruit trees by importations from abroad or from other parts of India.

29. The plantation of Arabian date trees receives much care, and up to the last few months promised well; but several trees have of late been destroyed by a species of grub, which attacks the roots, and it is feared that others will also go. The grub is not known in this part of India, though it has been identified with one which has done much damage in Singapore. It may possibly have been imported from the Persian Gulf with the plants now in the garden. As soon as a plant is ascertained to be attacked, it is dug up from the root and completely burnt in the hope of entirely destroying the pest; but so far this precaution has not been successful in preventing other trees from attack.

30. **Lucknow Horticultural Gardens.**—The season was not good and the yield of fruit was generally poor. The financial results were most satisfactory and creditable to Mr. Ridley. The total cash receipts amounted to Rs. 12,646 against Rs. 12,236 in the previous year. The total expenditure was Rs. 14,500 against Rs. 14,897 in the preceding year. As the value of trees and plants distributed gratis is estimated at Rs. 338, the gardens are now nearly self-supporting.

31. Improvements were confined to clearing and replanting a small area. The demand for acclimatized vegetable and flower seeds continues to increase. The number of plants, cuttings, &c., of fruit and ornamental trees and plants sent out by the gardens has nearly doubled within five years. The point of most interest under the head of exotic plantations is the testimony of the Locomotive Superintendent of the Bengal and North-Western Railway to the value of the leaves of the eucalyptus tree for cleaning engine boilers.

The demand for trained gardeners was much in excess of the supply. At present 16 boys are in training. Probably 20 are as many as can be efficiently managed.

32. **Matesar Garden, Kumaun.**—The garden was under the supervision of Mr. MacMaster during the year under report, and marked improvement is reported to have been made in its condition. The terracing of the land round the fruit trees has been completed, new roads made and all existing roads kept in good order. The two acres of land which were taken in last year for a nursery have been planted with stone seed of apricots, plums and peaches to furnish stock for grafting on. A good area was under potatoes, and though the crop was poor a fair income was realized by sales of potato seed. The manager receives more applications for seed than he can comply with, and the high price which good hill seed now commands has induced private persons settled in Kumaun to take up this industry. The demand is chiefly confined to Europeans, as native potato growers in the plains prefer Farukhabad potato seed. At first I thought this was on account of its comparative cheapness: but the real reason is that the country potato gives a larger crop than English seed brought down from the hills. Growers in the Farukhabad district have acknowledged to me a yield equivalent to nearly 6 tons the acre. No hill seed ever gives such results in the plains.

Notwithstanding the occurrence of a drought, which caused much injury to the young grafting stock, some 2,655 apple, 470 pear, and 190 chestnut grafts were distributed.

The total receipts amounted to Rs. 1,026-15-6 against Rs. 1,100 in 1888-89, and the expenditure to Rs. 2,630-5-10.

33. **Khusru Garden, Allahabad.**—This garden is under the control of the Collector of the district; but by recent orders of the Government I have been directed to give any assistance and advice to the local management that may be required. A copy of the Superintendent's report is annually received in my office. From the report of 1889-90 it appears that the expenditure amounted to Rs. 3,963-3-3, of which Rs. 1,478-2-6 represents the balance of the cost of a water-supply scheme. The actual expenditure of the garden was therefore Rs. 2,485-0-9. The receipts amounted to Rs. 2,076-9-6 against Rs. 3,999-10-11 in 1888-89. The decrease is due to shorter sales of grass, owing to a portion of the garden having been taken up for the Municipal Water Works. The fruit crop was also a failure.

34. **Taj Gardens.**—The connection of the Department with the Taj Gardens is the same as with the Khusru Gardens of Allahabad. The receipts in 1889-90 amounted to Rs. 1,917-11-6, and the expenditure to Rs. 9,999-2-10, of which Rs. 3,600 represents the Superintendent's pay.

The condition of the gardens is capable of improvement, and as the Superintendentship is now vacant, the opportunity should be taken to appoint a trained gardener. A project for watering the garden by steam power is under the consideration of the Collector.

35. **Date Palm Plantation.**—Reference has been made above to the date palm plantation at Saháranpur. A similar plantation is attached to the Lucknow Gardens, where, to economize space, the eucalyptus and the date have been grown together. This is now found not to answer, as the shade destroys the date. The date trees have also suffered severely from the attacks of a grub.

36. **Forecasts of Special Crops.**—Forecasts were issued during the year for wheat, oilseeds, cotton and indigo. Bulletins concerning each crop were received from members of the Agricultural Association and other correspondents. The help thus rendered to the Department is great, and I have thought it right to bring to the favourable notice of Government, in appendix E, the names of the gentlemen who have been most forward in their assistance.

## SECTION VI.

### Introduction of Agricultural Improvements.

37. **Agricultural Shows.**—These annual gatherings, under the name of agricultural shows, are now popular institutions in many districts of the provinces. During the year under review shows were held in 16 districts and also in the Native State of Rampur. This Department has nothing to do with the organization or arrangements of these gatherings, but contributes, when asked to do so, a collection of agricultural implements and sends a representative to assist in settling the details of ploughing and other competitions and adjudging the prizes to exhibitors of agricultural produce. During the year shows were held for the first time at Agra, Bánda, Gorakhpur, Sultánpur and Rampur. The Assistant Director attended nearly every show in the province, and I also was present at two or three. The Assistant Director's suggestions regarding the agricultural side of these shows were given in the report for last year and need not be repeated. While admitting the social value of these gatherings and the advantages sometimes accruing from them to the special industries of the localities, the Assistant Director is not disposed to rate very highly their effect on agriculture. He considers that insufficient time in the programme is given in these shows to agricultural trials and exhibits, and that amusements, and not instruction or edification, occupy the first place in the thoughts of the management. He recommends that one or two days should be devoted at the end of each show to practical agricultural business, and that the local committee should make this an object of primary importance: also that prizes for agricultural exhibits should be given to the exhibitors on the day of the speeches, and not, as is often the case, transmitted though the medium of the tahsíl. I give these as the suggestions of an officer who has had a very long acquaintance with the subject, and who earnestly desires to see established in every district a permanent association for

the study and advancement of agriculture which will make it its business to turn the annual district gatherings into channels of practical utility.

38. **Distribution and sale of implements.**—The following statement gives the distribution for the past year compared with the previous :—

*Comparative statement of distribution of implements from 1st October 1889 to 30th September 1890.*

| Name of implement. | In 1888-89. | | | | In 1889-90. | | | | More. | Less. |
|---|---|---|---|---|---|---|---|---|---|---|
| | Sold. | Trial. | Hire. | Total. | Sold. | Trial. | Hire. | Total. | | |
| Ploughs ... ... | 84 | 3 | 7 | 94 | 84 | 8 | 1 | 93 | ... | 1 |
| Chain pumps ... ... | 22 | 14 | 6 | 42 | 15 | 13 | 3 | 31 | ... | 11 |
| Sugar pans ... ... | 1 | 1 | ... | 2 | 2 | ... | ... | 2 | ... | ... |
| Grain kibbling mills ... | 24 | 1 | ... | 25 | 16 | ... | ... | 16 | ... | 9 |
| Chaff cutters ... ... | 8 | 1 | ... | 9 | 6 | ... | 1 | 7 | ... | 2 |
| Bull's dredger ... ... | ... | 2 | 1 | 3 | ... | 3 | ... | 3 | ... | ... |
| Boring apparatus ... ... | ... | 7 | ... | 7 | ... | 9 | ... | 9 | 2 | ... |

The sales show a decrease on those for the previous year. This is chiefly due to the strict enforcement of the rule regarding prepayment in cash which it has been found necessary to prescribe. The pumps are unquestionably useful for canal lift-irrigation or for tank irrigation. They are often borrowed by cultivators living near the farm, but the price stands in the way of their becoming generally popular. Instances have occurred of ordinary cultivators having come long distances to the farm to hire a pump during the irrigation season. An illustrated catalogue of all the implements made and sold at the Farm workshop has just been completed.

39. **Distribution of seed.**—The following statement shows the amount and kinds of seed distributed during the year :—

| Name of seed. | In 1888-89. | In 1889-90. | Difference. | |
|---|---|---|---|---|
| | | | More. | Less. |
| | lbs. | lbs. | | lbs. |
| Wheat Muzaffarnagar ... ... ... | 39,767 | 12,903 | ... | 26,863 |
| „ Mundia ... ... ... ... | 963 | 123 | ... | 840 |
| „ Buxar ... ... ... ... | 125 | 82 | ... | 43 |
| „ Sindhi ... ... ... ... | 609 | 670 | 61 | ... |
| „ Adelaide ... ... ... ... | 564 | 287 | ... | 277 |
| „ Canadian ... ... ... ... | ... | 10 | 10 | ... |
| | 42,028 | 14,075 | ... | 27,953 |
| Barley ... ... ... ... ... | 740 | 225 | ... | 515 |
| Oats ... ... ... ... ... | 7,367 | 2,648 | ... | 4,719 |
| Peas ... ... ... ... ... | 683 | 20 | ... | 662 |
| Sorghum ... ... ... ... | 729 | 83 | ... | 646 |
| Nankin cotton ... ... ... ... | 14 | ... | ... | 14 |
| Guinea grass ... ... ... ... | 4½ | 2 | ... | 2½ |
| Lucerne grass ... ... ... ... | 26½ | 28¼ | 1¾ | ... |
| Tobacco ... ... ... ... | ¼ | *Nil.* | ... | ¼ |
| Mangold ... ... ... ... | 2 | 18 | 16 | ... |
| Turnip ... ... ... ... ... | 4¼ | 14½ | 10¼ | ... |
| Carrot ... ... ... ... ... | ... | 10 | 10 | ... |

The falling-off is due to the strict observance of a rule recently made by which the purchaser is charged the full price of packing and carriage; prepayment is also required. A great deal of trouble is taken to clean and select seed, and the produce of the farm is steadily improving in quality.

Some varieties of Canadian wheats, oats and barleys were received from Canada, and have been distributed for experiment. The result will be noticed next year.

40. **The Agricultural Association.**—A successful meeting of this society was held at Budaun on the 7th and 8th of February, at which I presided. The arrangements were voluntarily undertaken and liberally carried through by Chaudhari Sayyid-ud-din, Raïs of Khera, Budaun district, who takes a great interest in agricultural

matters and maintains on his property an experimental farm. The meeting was attended by 21 members of the society, some of them coming from long distances and at considerable inconvenience to themselves. A few visitors were also admitted. The rules of the association were carefully revised, and papers were read on agriculture followed by discussions. The experimental farm was also inspected. The members of the association, recognising the fact that a provincial society can seldom meet and can do little in a collective capacity, agreed to do their best, each in his own district, to establish a branch society for the local promotion of agriculture. Such associations are now established in the districts of Agra, Bijnor, Moradabad, Shahjahánpur, Allahabad, Muzaffarnagar and Saháranpur. During the past year the members of the provincial association have given the Department much assistance in furnishing forecasts of crops. In 1891 the meeting of the association will probably be held at Cawnpore. Among the local societies the Jamnapár Association in the Allahabad district, which was started by Mr. F. W. Porter, is the most active, and is evidently doing much useful work.

41. **Urdu Agricultural Journal.**—The circulation of the journal has increased considerably during the year, as 421 copies are now issued every month against 274 in the preceding year. Each number contains 3 or 4 pages of editorial matter and 8 to 12 pages of translations from English agricultural journals, experimental farm reports and correspondence. The journal seems to be popular with the subscribers, and its usefulness may be expected to increase.

42. **Demonstration of ploughs, pumps, &c.**—The implements are usually exhibited at district shows and attract a good deal of attention .Occasionally ploughmen are borrowed from the Cawnpore Farm by native gentlemen to teach their servants the use of the departmental ploughs. The farm possesses 7 sets of boring tools, and not unfrequently is asked to lend them and to send a trained workman to supervise borings and to conduct well sinkings. One is thus employed at present in Aligarh, where a deep well is being sunk in the compound of the Aligarh College.

## SECTION VII.

### Registration of Traffic.

43. The following traffic was registered during the year 1889-90 :—

(*a*)—Foreign traffic with Thibet and Nipal.

(*b*)—Traffic by rail with other British provinces and Native States.

(*c*)—Road traffic of Dehra Dún.

44. **Traffic with Thibet and Nipal.**—Traffic with Thibet and Nipal was registered by the same cordon of posts during the year 1889-90. The posts have been duly inspected during the year by an Inspector.

The following table shows the total trade transacted with the two countries in 1888-89 and 1889-90 :—

| | 1889-90. | | 1888-89. | |
|---|---|---|---|---|
| | Weight. | Value. | Weight. | Value. |
| *Imports*— | Mds. | Rs. | Mds. | Rs. |
| From Thibet ... ... ... | 67,186 | 6,89,072 | 1,13,529 | 8,58,291 |
| From Nipal ... ... ... | 19,42,248 | 50,14,196 | 26,92,572 | 56,99,519 |
| Total ... | 20,09,434 | 57,03,268 | 28,06,101 | 65,57,810 |
| *Exports*— | | | | |
| To Thibet ... ... ... ... | 54,774 | 2,76,863 | 1,14,433 | 4,34,034 |
| To Nipal ... ... ... ... | 2,57,848 | 36,24,630 | 2,47,213 | 35,21,732 |
| Total ... | 3,12,622 | 39,01,493 | 3,61,646 | 39,55,766 |

The decrease in the import from Nipal was mostly in timber, due to a change in the policy of the Nipal Darbár, by which the timber revenue outposts have been turned into timber stores. The timber is now cut by the Nipalese, and British subjects are no longer permitted to cut and export timber after the old fashion.

There was some decrease in the import of oilseed and fibres and also in the value of silver, but it was more than counterbalanced by an increase in the import of rice.

| | *Weight.* Mds. | *Value.* Rs. |
|---|---|---|
| Total decrease in the import from Nepal ... ... | 7,50,324 | 6,85,323 |
| Decrease under timber ... ... ... | 9,36,151 | 11,65,809 |
| Ditto oil-seeds ... ... ... | 29,701 | 1,00,420 |
| Ditto fibres, raw ... ... ... | 73,275 | 49,734 |
| Ditto silver ... ... ... ... | ... | 1,83,197 |
| Increase under rice ... ... ... ... | 3,26,311 | 7,90,470 |

In the exports to Nipal there was a slight increase. It occurred principally in the export of metals and salt,

| | *Weight.* Mds. | *Value.* Rs. |
|---|---|---|
| Total increase in the export to Nipal ... ... | 10,635 | 1,02,898 |
| Increase under metals ... ... ... ... | 1,502 | 52,949 |
| Ditto salt ... ... ... ... | 5,940 | 36,469 |

The decrease in the import from Thibet was due to fluctuations in the traffic of borax, salt and wool, considerably less quantities of which were imported during the present year. The export of grain, in which article payment is made for imports of salt, also fell off. There was some increase in the number of horses imported during the year,

| | *Weight.* Mds. | *Value.* Rs. |
|---|---|---|
| Total decrease in the import from Thibet ... ... | 46,343 | 1,69,219 |
| Decrease under borax ... ... ... ... | 25,114 | 2,04,034 |
| Ditto salt ... ... ... ... | 17,431 | 72,920 |
| Ditto wool ... ... ... ... | 3,954 | 74,606 |
| Increase in the number of horses ... ... | 1,124 | 1,12,160 |
| Total decrease in the export to Thibet ... ... | 59,659 | 1,57,171 |
| Decrease under grain ... ... ... | 59,224 | 1,68,380 |

45. **Rail-borne traffic.**—The rail-borne traffic of the province continued to be registered on the block system described in previous years' reports.

No alteration was made in the system of registration. Returns were regularly received for each quarter from railway offices, and were compiled and published for the information of merchants and others interested in the subject. The boundaries of the internal blocks into which these provinces are divided for registration remained unchanged. With regard to the external blocks, the portion of the recently opened Bhopal and Indian Midland Railway, which comprises the railway stations of Koronda, Bina, Bamora, Hoshangabad and Itarsi, was included in the Central Provinces block, and the portion which lies between Kulhar to Datia in the Rajputana and Central India block. The value of imports from the ports and British provinces has, as in the preceding year, been computed at the rates furnished by exporting provinces, while the exports from these provinces and the imports from Native States have been valued at the rates prevailing in the Cawnpore market.

The total traffic (imports and exports) which these provinces transacted with other British provinces, ports and Native States during the year 1889-90 amounted to 4,06,85,388 maunds, valued at Rs. 27,81,44,910, against 4,04,60,153 maunds, valued at Rs. 26,07,87,485 in the preceding year. The following table shows the traffic with each province, port and Native State :—

| | Exports. | | | | Imports. | | | |
|---|---|---|---|---|---|---|---|---|
| | 1889. | | 1890. | | 1889. | | 1890. | |
| *British Provinces, excluding chief seaport towns.* | Mds. | Rs. | Mds. | Rs. | Mds. | Rs. | Mds. | Rs. |
| Madras ... ... ... ... ... ... | 12,342 | 1,96,517 | 9,150 | 1,58,076 | 859 | 22,941 | 991 | 19,716 |
| Bombay ... ... ... ... ... ... | 6,09,065 | 31,34,143 | 8,24,566 | 41,85,493 | 3,13,978 | 20,89,848 | 3,61,463 | 23,86,463 |
| Sindh ... ... ... ... ... ... | 2,10,774 | 9,73,850 | 1,45,827 | 7,31,969 | 684 | 6,428 | 858 | 9,754 |
| Bengal ... ... ... ... ... ... | 20,70,630 | 1,12,10,861 | 24,14,885 | 1,16,27,239 | 82,79,866 | 1,20,31,621 | 74,44,628 | 1,18,69,682 |
| Panjáb ... ... ... ... ... ... | 42,18,354 | 2,00,21,357 | 53,05,589 | 2,35,34,894 | 25,87,129 | 1,96,42,073 | 21,41,223 | 1,61,60,686 |
| Central Provinces ... ... ... ... ... | 4,80,949 | 35,86,277 | 4,72,304 | 35,42,534 | 2,63,431 | 25,97,400 | 3,37,203 | 22,91,057 |
| Berar ... ... ... ... ... ... | 1,10,265 | 7,15,650 | 1,60,051 | 10,56,329 | 49,879 | 8,55,358 | 57,193 | 10,52,538 |
| Total ... | 77,12,379 | 3,98,38,655 | 93,32,372 | 4,48,36,534 | 1,14,95,826 | 3,72,45,669 | 1,03,43,559 | 3,37,89,896 |
| *Native States.* | | | | | | | | |
| Rajputana and Central India ... ... ... ... | 35,61,106 | 1,62,05,168 | 34,64,345 | 1,64,31,058 | 34,38,917 | 1,33,85,997 | 37,05,683 | 1,37,71,138 |
| Nizam's Territory ... ... ... ... ... | 4,029 | 1,15,835 | 4,464 | 79,862 | 317 | 2,965 | 244 | 1,540 |
| Mysore ... ... ... ... ... ... | 5,274 | 87,995 | 4,238 | 70,601 | 11 | 504 | 112 | 659 |
| Total ... | 35,70,409 | 1,64,08,998 | 34,73,047 | 1,65,81,521 | 34,39,245 | 1,33,89,466 | 37,06,039 | 1,37,73,337 |
| *Chief seaport towns.* | | | | | | | | |
| Madras ... ... ... ... ... ... | 71,987 | 12,40,111 | 60,400 | 10,55,895 | 963 | 32,940 | 892 | 26,006 |
| Bombay ... ... ... ... ... ... | 42,01,644 | 2,38,63,054 | 36,28,480 | 2,87,35,174 | 3,41,310 | 83,38,193 | 4,50,168 | 1,11,13,431 |
| Karachi ... ... ... ... ... ... | 25,005 | 1,45,884 | 13,617 | 1,00,888 | 53,751 | 3,12,675 | 46,757 | 2,80,611 |
| Calcutta ... ... ... ... ... ... | 73,25,443 | 6,98,86,988 | 72,00,393 | 7,36,96,752 | 22,22,191 | 5,00,84,852 | 24,29,664 | 5,41,54,865 |
| Total ... | 1,16,24,079 | 9,51,36,037 | 1,09,02,890 | 10,35,88,709 | 26,18,215 | 5,87,68,660 | 29,27,481 | 6,55,74,913 |
| Grand Total ... | 2,29,06,867 | 15,13,83,690 | 2,37,08,309 | 16,50,06,764 | 1,75,53,286 | 10,94,03,795 | 1,69,77,079 | 11,31,38,146 |

46. The trade with the four great seaports of India is, as this statement shows, registered separately. Both in volume and value the exports from these provinces to Calcutta exceed those to the port of Bombay, while the imports from Calcutta are between five and six times larger than those from Bombay. In comparison with the trade of these two seaports with these provinces, the figures for Madras and Karachi are insignificant. In 1889-90 the value of the exports to Calcutta and Bombay showed an increase on the value for the previous year, while the increase in value was accompanied by a decrease in volume. This is explained, as the figures given in the table next appended show, by a considerable increase in the exports of more valuable commodities, such as cotton, ghí, indigo and opium, and a decrease in less valuable (in proportion to bulk) commodities, such as wheat, oilseeds, hides and skins. The imports from Calcutta and Bombay for 1889-90 show an increase both in weight and value over those for 1888-89, the increase in value being greater proportionally than the increase in weight. This was chiefly due to larger imports of metals and to higher values assigned to cotton goods.

47. Excluding the trade with the seaports, the trade between these provinces and the blocks of the Panjáb and Bengal is of the most importance. The export trade to the former of these two blocks is double that to the latter; but the imports from Bengal are in weight three times greater than from the Panjáb. In 1889-90 the export trade to both these blocks was larger than in the preceding year, due chiefly to increased exports of grain, cotton and coal. The imports, on the other hand, were smaller from both, the decrease amounting to 37 lakhs of rupees in the case of the Panjáb under the two heads of cotton goods and grain. About one-tenth of the total imports of cotton goods of European manufacture into the North-Western Provinces and Oudh is ordinarily received from the Panjáb (exclusive of the seaport of Karachi), Delhi being the chief distributing centre. This trade showed a large decrease in 1889-90. The decrease in the imports of grain from the Panjáb, conjoined with an increase in grain exports to it from the North-Western Provinces and Oudh, would seem to imply poor harvests in that province. The decrease in the imports from Bengal was chiefly under rice and was balanced to a great extent by increases under spices and tobacco.

*Export.*

| | *Weight.* | *Value.* |
|---|---|---|
| | Mds. | Rs. |
| Panjáb, total increases ... ... ... ... | **10,87,235** | **35,13,537** |
| Increase under grain ... ... ... ... | 3,41,855 | 11,93,148 |
| Ditto coal ... ... ... ... | 3,68,368 | 3,68,368 |
| Ditto other articles of merchandise ... ... | 4,20,076 | 14,70,265 |
| Bengal, total increase ... ... ... ... | **3,44,255** | **4,16,378** |
| Increase under cotton ... ... ... ... | 46,184 | 7,61,818 |
| Ditto grain ... ... ... ... | 4,92,389 | 10,37,428 |
| Ditto lime and stone ... ... ... | 95,167 | 95,167 |
| Less decrease under oilseeds ... ... ... | 2,83,397 | 9,14,741 |
| Bombay Presidency, total increase ... ... ... | **2,15,501** | **10,51,350** |
| Increase under cotton ... ... ... ... | 10,161 | 1,69,851 |
| Ditto grain ... ... ... ... | 1,41,568 | 4,14,922 |
| Ditto sugar ... ... ... ... | 70,420 | 4,44,999 |
| Calcutta and Bombay, total decrease in weight ... ... | **7,98,214** | ... |
| ditto increase in value ... ... | ... | **86,81,884** |
| Decrease under wheat ... ... | 9,33,585 | 20,15,831 |
| Ditto oilseeds ... ... | 12,52,228 | 23,07,234 |
| Ditto hides and skins ... | 51,976 | 23,75,673 |
| Less increase under cotton ... ... | 5,63,176 | 93,12,942 |
| Ditto ditto ghí ... ... | 30,300 | 10,69,623 |
| Ditto ditto opium ... ... | 7,109 | 20,61,610 |
| Ditto ditto indigo ... ... | 14,054 | 17,02,660 |
| Ditto ditto grain besides wheat ... | 7,19,283 | 14,13,593 |

*Import.*

| | *Weight.* Mds. | *Value.* Rs. |
|---|---|---|
| Panjáb, total decrease ... ... ... ... | 4,45,906 | 34,81,337 |
| Decrease under cotton goods ... ... ... | 13,463 | 24,88,407 |
| Ditto grain ... ... ... ... ... | 5,01,824 | 12,23,328 |
| Bengal, total decrease ... ... ... ... | 8,35,238 | 1,61,939 |
| Decrease under coal ... ... ... ... | 4,09,718 | 1,53,644 |
| Ditto rice ... ... ... ... ... | 4,77,204 | 10,60,940 |
| Less increase under spices ... ... ... | 15,986 | 6,19,879 |
| Ditto tobacco ... ... ... | 52,218 | 3,24,835 |
| Calcutta and Bombay, total increase ... ... ... | 3,16,331 | 68,45,251 |
| Increase under metals ... ... | 2,14,489 | 34,68,062 |
| Ditto cotton goods ... ... ... | | 19,90,263 |

48. **Road traffic of Dehra Dun.**—Registration of road traffic in the Dún was started in February 1890, in connection with several railway projects which have of recent years been advocated. The registering posts will be retained till the end of January 1891, when the results will be examined and published.

## SECTION VIII.

### Miscellaneous.

49. **Scarcity in Garhwal.**—In April last, when scarcity declared itself in Garhwál and the Government decided on importing stocks of grain, I was directed to purchase 36,000 maunds of gram and barley in suitable markets in the province and arrange for their transport from the nearest railway stations to the submontane depôts of the Garhwál district. Delivery was to be completed by the end of April or beginning of May in order to enable the local officers to transport the grain to higher depôts before the beginning of the rains. I found that the stocks of barley and gram in the largest marts of the province were very small, and I had some difficulty in obtaining the quantity required. A good deal of it in fact had to be ordered from Ludhiana and the Southern Panjáb. It was also doubtful at one time whether the date fixed by Government for delivery could be kept, as the transport of a bulky article like grain in country carts on unmetalled roads is tedious. In the matter of transport, however, I was most efficiently assisted by the Tahsíldárs of Najibabad, Moradabad and Nagina, and the delivery of the grain would have been entirely completed by date had the Garhwal officials been able to receive and house it. As it was, all the grain was delivered in sufficient time for conveyance before the rains to the hill depôts.

50. **The Lucknow Museum.**—The administration of the museum by the Managing Committee has been satisfactory, and its collections have increased by 1,952 new specimens, one of the most important additions being the inscribed silver copper seal of Kumaragupta, which gives a genealogy of the early Gupta dynasty.

The total number of visitors to the museum was 1,82,454, as compared with 2,06,128 in the previous year. The largest attendance was 10,984 on 7th November 1889, a Hindu bathing day. For the admission of *pardanashin* women the committee has set apart half the day on the 15th of every month.

The total sale of art wares amounted to Rs. 3,798-9-10 against Rs. 5,413-1-7 in the preceding year. The total expenditure amounted to Rs. 14,972-3-1 against Rs. 16,062-10-1 in 1888-89. The receipts amounted to Rs. 2,053-12-9 against Rs. 1,764-4-3 in the preceding year.

51. **Emigration of cultivators to Central Provinces.**—In pursuance of the orders contained in the Government of India's Circular No. $\frac{96}{6\cdot59}$F., dated 19th October 1888, suggesting that emigration should be assisted from the congested districts of these provinces to the Central Provinces, the Government of the North-Western Provinces and Oudh addressed the Chief Commissioner of Central Provinces, inquiring (1) whether waste lands were available for immigrants from the North-Western Provinces; (2) the terms on which such lands would be granted; and (3) the extent of such lands and their general character. A reply from the Chief Commissioner was received to the effect that some 600 square miles of the western portion of the Harda tahsíl in the

Hoshangabad district, known as the Charwa jungles, were available for settling cultivators: but that, owing to the notorious unhealthiness of the locality, the terms on which the lands would be granted could better be settled after the locality had been visited by an officer of the North-Western Provinces Government accompanied by some experienced cultivators. I was accordingly directed to visit the tract, and in January 1890 I went there, taking with me a few cultivators and land-owners. The cultivators were unable to come to terms with Mr. Fuller, the representative of the Central Provinces Government, as they required large advances of money and other concessions. Three or four of the zamíndárs applied for villages and promised to bring down cultivators from the North-Western Provinces. But after further correspondence they found themselves unable to accept the terms finally offered by the Chief Commissioner, and the matter dropped. Colonists from a distance naturally ask for better terms than persons resident in the country: and as the Government of the Central Provinces has no difficulty in disposing locally of its waste lands it is not inclined to make large concessions to outsiders. The proposed emigration scheme had not the elements of success, inasmuch as the emigrants were not wanted in the country pointed out to them.

52. **Locusts.**—Two notes on locusts in India by Mr. Cotes, Assistant Superintendent, Indian Museum, were received through the Local Government and circulated to the District Officers in the North-Western Provinces and Oudh with a view to obtain specimens of locusts and information regarding them. Mr. Cotes' application was responded to by many officers.

53. **Specifications of inventions.**—Seven cases were received during the year from the Government of India for report.

54. **General.**—I held the office of Director throughout the year. The cold weather was spent in a tour through the Lucknow and Fyzabad Divisions of Oudh, inspecting the working of patwáris and kanúngos, and through part of the Benares Division, where the insufficiency of the staff urgently required attention. I also went to the Central Provinces for a week to inspect the Charwa jungles with Mr. Fuller, and report on the possibility of settling emigrants from these provinces in that tract. At the end of the camping season I visited a number of districts by rail and showed Dr. Vöelcker something of the agriculture of the Cawnpore district. In April and part of May I was occupied with the Garhwál grain arrangements. In July and part of August I held kanúngo examinations at headquarter stations throughout the province. The duties of the Director have been increased by his appointment to be *ex officio* Secretary of the Sanitary Board, North-Western Provinces and Oudh.

Mir Muhammad Husain, M.R.A.C., held the office of Assistant Director during the year till September 1890, when he was deputed to the Factory Commission. His activity, energy and unflagging interest in all that concerns the agricultural future of India are too well known to Government to require commendation from me.

Babu Lachman Parshad, B.A., my Personal Assistant, continued in charge of the statistical work and discharged it with his accustomed ability and fidelity. During the absence of Mir Muhammad Husain he officiated as Assistant Director.

I have the honour to be,

SIR,

Your most obedient servant,

T. W. HOLDERNESS,

*Director.*

## APPENDIX A.

*Memorandum showing the expenditure and receipts of the Department of Land Records and Agriculture, North-Western Provinces and Oudh, during* 1889-90.

| Heads of charges. | Budgetted allotment. | Actual expenditure. | Saving on budgetted expenditure. | Receipts paid into Treasury. |
|---|---|---|---|---|
| | Rs. a. p. | Rs. a. p. | Rs. a. p. | Rs. a. p. |
| Office establishment ... ... ... | 24,468 0 0 | 24,572 2 11 | ... | ... |
| Do. contingencies ... ... ... | 7,144 0 0 | 7,065 5 4 | 78 10 8 | ... |
| Do. travelling allowance ... ... | 2,500 0 0 | 1,270 1 9 | 1,229 14 3 | ... |
| Gházipur tobacco farm ... ... | 3,000 0 0 | 2,599 10 4 | 400 5 8 | 9,750 0 0 |
| Reh and glass experiments ... ... | ... | ... | ... | ... |
| Traffic registration ... ... ... | 9,000 0 0 | 8,949 1 4 | 50 14 8 | ... |
| Cawnpore experimental station contingencies ... | 9,332 0 0 | 8,917 10 8 | 414 5 4 | 2,769 15 6 |
| Do. establishment ... ... | 4,068 0 0 | 4,016 7 0 | 51 9 0 | ... |
| Do. workshop ... ... ... | 7,000 0 0 | 6,073 7 10 | 926 8 2 | 3,521 3 0 |
| Tea shop ... ... ... ... | 300 0 0 | ... | 300 0 0 | ... |
| Well fund ... ... ... ... | 2,000 0 0 | 1,532 6 6 | 467 9 6 | ... |
| Usar fund ... ... ... ... | 5,000 0 0 | 4,999 11 4 | 0 4 8 | 1,393 4 3 |
| Miscellaneous ... ... ... | ... | ... | ... | 168 2 8 |
| Total Rs. ... | 73,812 0 0 | 69,996 1 0 | 3,920 1 11 | 17,602 9 5 |

LIBRARY

Certified that the receipts in this office were checked in the manner prescribed in G. O. Circular No. 34, dated 5th October 1882.

T. W. HOLDERNESS,
*Director.*

APPEN

*Statement showing arboriculture receipts*

| District. | Receipts. | | | | | | Total. |
|---|---|---|---|---|---|---|---|
| | 1884-85. | 1885-86. | 1886-87. | 1887-88. | 1888-89. | 1889-90. | |
| | Rs. | Rs. | Rs. | Rs. | Rs. | Rs. | Rs. |
| Dehra Dún ... ... ... | 254 | ... | ... | 33 | 5 | ... | 292 |
| Saháranpur ... ... ... | 476 | 1,284 | 914 | 787 | 3,111 | 968 | 7,540 |
| Muzaffarnagar ... ... ... | 3,678 | 2,805 | 3,280 | 3,456 | 5,107 | 3,258 | 21,584 |
| Meerut ... ... ... | 2,996 | 5,741 | 4,622 | 3,089 | 3,363 | 3,963 | 23,774 |
| Bulandshahr ... ... ... | 1,634 | 10,403 | 4,362 | 1,306 | 2,842 | 4,530 | 25,077 |
| Aligarh ... ... ... | 2,855 | 4,754 | 2,822 | 824 | 1,091 | 1,413 | 13,759 |
| Total ... | 11,893 | 24,987 | 16,000 | 9,495 | 15,519 | 14,132 | 92,026 |
| Muttra ... ... ... | 689 | 717 | 550 | 455 | 957 | 1,222 | 4,590 |
| Agra ... ... ... | 1,268 | 1,775 | 1,283 | 1,001 | 1,476 | 1,885 | 8,688 |
| Farukhabad ... ... ... | 578 | 621 | 212 | 669 | 426 | 1,019 | 3,525 |
| Mainpuri ... ... ... | 1,178 | 1,597 | 1,551 | 619 | 814 | 1,189 | 6,948 |
| Etáwah ... ... ... | 285 | 160 | 193 | 394 | 155 | 292 | 1,479 |
| Etah ... ... ... | 689 | 923 | 610 | 638 | 762 | 782 | 4,404 |
| Total ... | 4,687 | 5,793 | 4,399 | 3,776 | 4,590 | 6,389 | 29,634 |
| Bijnor ... ... ... | 908 | 676 | 837 | 924 | 1,836 | 1,705 | 6,886 |
| Moradabad ... ... ... | 893 | 1,012 | 840 | 1,545 | 3,961 | 2,726 | 10,977 |
| Budaun ... ... ... | 831 | 729 | 815 | 612 | 924 | 686 | 4,597 |
| Bareilly ... ... ... | 964 | 910 | 944 | 403 | 1,465 | 1,019 | 5,705 |
| Sháhjahánpur ... ... ... | 572 | 310 | 434 | 288 | 1,150 | 610 | 3,364 |
| Pilibhít ... ... ... | 4 | 59 | 536 | 760 | 790 | 856 | 3,005 |
| Total ... | 4,172 | 3,696 | 4,406 | 4,532 | 10,126 | 7,602 | 34,534 |
| Cawnpore ... ... ... | 1,134 | 1,412 | 1,895 | 1,301 | 2,056 | 1,828 | 9,626 |
| Fatehpur ... ... ... | 807 | 849 | 461 | 804 | 524 | 387 | 3,832 |
| Bánda ... ... ... | 318 | 605 | 426 | 301 | 638 | 334 | 2,622 |
| Hamírpur ... ... ... | 349 | 386 | 551 | 277 | 321 | 262 | 2,146 |
| Allahabad ... ... ... | 647 | 546 | 768 | 533 | 941 | 618 | 4,053 |
| Jaunpur ... ... ... | 1,259 | 1,050 | 1,414 | 4,079 | 2,929 | 2,736 | 13,467 |
| Total ... | 4,514 | 4,848 | 5,515 | 7,295 | 7,409 | 6,165 | 35,746 |
| Azamgarh ... ... ... | 635 | 966 | 1,397 | 822 | 754 | 636 | 5,210 |
| Mirzapur ... ... ... | 383 | 375 | 517 | 313 | 864 | 514 | 2,966 |
| Benares ... ... ... | 2,695 | 868 | 2,370 | 1,120 | 1,014 | 1,924 | 9,991 |
| Gházipur ... ... ... | 212 | 74 | 146 | 280 | 443 | 552 | 1,707 |
| Gorakhpur ... ... ... | 417 | 27 | 100 | 146 | 113 | 544 | 1,347 |
| Basti ... ... ... | 125 | 47 | 84 | 81 | 272 | 282 | 891 |
| Ballia ... ... ... | 63 | 57 | 30 | 47 | 48 | 66 | 311 |
| Total ... | 4,530 | 2,414 | 4,644 | 2,809 | 3,508 | 4,518 | 22,423 |
| Jhánsi ... ... ... | 457 | 253 | 355 | 300 | 344 | 487 | 2,196 |
| Jalaun ... ... ... | 384 | 297 | 162 | 449 | 276 | 281 | 1,849 |
| Lalitpur ... ... ... | 53 | 107 | 299 | 168 | 192 | 106 | 925 |
| Total ... | 894 | 657 | 816 | 917 | 812 | 874 | 4,970 |
| Kumaun ... ... ... | ... | ... | ... | ... | ... | ... | ... |
| Garhwál ... ... ... | ... | ... | ... | ... | ... | ... | ... |
| Tarái ... ... ... | ... | ... | ... | ... | ... | ... | ... |
| Total ... | ... | ... | ... | ... | ... | ... | ... |
| Lucknow ... ... ... | 1,149 | 178 | 531 | 547 | 740 | 741 | 3,886 |
| Unao ... ... ... | 163 | 125 | 220 | 347 | 666 | 210 | 1,731 |
| Bara Banki ... ... ... | 372 | 265 | 191 | 183 | 528 | 1,286 | 2,825 |
| Total ... | 1,684 | 568 | 942 | 1,077 | 1,934 | 2,237 | 8,442 |
| Sitapur ... ... ... | 52 | 263 | 117 | 103 | 163 | 313 | 1,011 |
| Hardoi ... ... ... | 658 | 185 | 227 | 89 | 232 | 1,448 | 2,839 |
| Kheri ... ... ... | 9 | 33 | 14 | 48 | 52 | 18 | 174 |
| Total ... | 719 | 481 | 358 | 240 | 447 | 1,779 | 4,024 |
| Fyzabad ... ... ... | 117 | 122 | 538 | 1,355 | 849 | 594 | 3,575 |
| Bahraich ... ... ... | 44 | 147 | 87 | 114 | 164 | 673 | 1,229 |
| Gonda ... ... ... | 4 | 113 | 487 | 59 | 232 | 354 | 1,249 |
| Total ... | 165 | 382 | 1,112 | 1,528 | 1,245 | 1,621 | 6,053 |
| Rai Bareli ... ... ... | 94 | 114 | 150 | 104 | 120 | 54 | 636 |
| Sultanpur ... ... ... | 78 | 103 | 249 | 615 | 392 | 473 | 1,910 |
| Partabgarh ... ... ... | 477 | 475 | 430 | 502 | 882 | 616 | 3,382 |
| Total ... | 649 | 692 | 829 | 1,221 | 1,394 | 1,143 | 5,928 |
| Total ... | 33,907 | 44,518 | 39,021 | 32,890 | 46,984 | 46,460 | 2,43,780 |
| Lucknow Exotic plantations ... ... | ... | ... | ... | ... | 43 | ... | ... |
| „ Date „ ... ... | ... | ... | ... | ... | 36 | ... | ... |
| Agra Exotic „ ... ... | ... | ... | ... | ... | ... | ... | ... |
| Cawnpore Farm and Head-quarter charges, ... | ... | ... | ... | ... | ... | ... | ... |
| Total ... | 33,907 | 44,518 | 39,021 | 32,890 | 47,063 | 46,460 | 2,43,780 |

DIX B.

*and charges from* 1884-85 *to* 1889-90.

| Charges. | | | | | | Total. | Average receipts per year. | Average expenditure per year. |
|---|---|---|---|---|---|---|---|---|
| 1884-85. | 1885-86. | 1886-87. | 1887-88. | 1888-89. | 1889-90. | | | |
| Rs. | Rs. | Rs. | Rs. | Rs. | Rs. | Rs. | Rs. | Rs. |
| 600 | 337 | 550 | 400 | 400 | 448 | 2,735 | 49 | 456 |
| 1,594 | 1,344 | 1,846 | 1,739 | 1,797 | 2,100 | 10,420 | 1,257 | 1,737 |
| 2,640 | 2,662 | 3,547 | 3,338 | 2,863 | 3,528 | 18,578 | 3,597 | 3,096 |
| 1,800 | 1,440 | 1,700 | 1,884 | 1,891 | 2,029 | 10,744 | 3,962 | 1,791 |
| 2,600 | 1,561 | 2,481 | 5,000 | 2,100 | 3,642 | 17,384 | 4,180 | 2,897 |
| 3,585 | 2,995 | 3,455 | 3,374 | 2,400 | 2,738 | 18,547 | 2,293 | 3,091 |
| 12,819 | 10,339 | 13,579 | 15,735 | 11,451 | 14,485 | 78,408 | 15,338 | 13,068 |
| 2,867 | 2,002 | 2,002 | 2,000 | 2,545 | 1,980 | 13,396 | 765 | 2,233 |
| 2,894 | 1,884 | 2,543 | 3,317 | 2,572 | 2,792 | 16,002 | 1,448 | 2,667 |
| 687 | 673 | 1,350 | 1,159 | 1,800 | 1,798 | 7,467 | 587 | 1,245 |
| 1,298 | 952 | 1,300 | 1,196 | 1,300 | 1,219 | 7,265 | 1,158 | 1,211 |
| 1,500 | 1,124 | 905 | 1,358 | 1,086 | 1,396 | 7,369 | 247 | 1,228 |
| 1,498 | 912 | 1,513 | 1,395 | 1,200 | 1,195 | 7,713 | 734 | 1,285 |
| 10,744 | 7,547 | 9,613 | 10,425 | 10,503 | 10,380 | 59,212 | 4,939 | 9,869 |
| 900 | 675 | 900 | 800 | 861 | 892 | 5,028 | 1,148 | 838 |
| 2,179 | 1,177 | 1,600 | 2,047 | 2,100 | 1,600 | 10,703 | 1,829 | 1,784 |
| 898 | 735 | 1,263 | 811 | 1,300 | 1,124 | 6,131 | 766 | 1,022 |
| 2,507 | 1,950 | 2,506 | 2,487 | 2,376 | 2,393 | 14,219 | 951 | 2,370 |
| 1,592 | 1,074 | 1,497 | 1,238 | 1,197 | 1,173 | 7,771 | 561 | 1,295 |
| 180 | 150 | 100 | 187 | 283 | 470 | 1,370 | 501 | 228 |
| 8,256 | 5,761 | 7,866 | 7,570 | 8,117 | 7,652 | 45,222 | 5,756 | 7,537 |
| 1,476 | 1,326 | 1,789 | 1,990 | 1,798 | 1,799 | 10,178 | 1,604 | 1,696 |
| 1,000 | 1,130 | 1,215 | 1,433 | 1,300 | 1,400 | 7,478 | 639 | 1,246 |
| 4,000 | 3,044 | 2,348 | 3,577 | 2,758 | 2,493 | 18,220 | 437 | 3,037 |
| 1,970 | 1,350 | 1,101 | 1,800 | 1,498 | 1,476 | 9,195 | 358 | 1,532 |
| 1,136 | 1,185 | 1,580 | 1,831 | 1,768 | 1,593 | 9,093 | 675 | 1,516 |
| 1,900 | 1,656 | 2,211 | 2,010 | 2,098 | 2,292 | 12,167 | 2,245 | 2,028 |
| 11,482 | 9,691 | 10,244 | 12,641 | 11,220 | 11,053 | 66,331 | 5,958 | 11,055 |
| 722 | 443 | 800 | 800 | 800 | 800 | 4,365 | 868 | 727 |
| 1,799 | 1,275 | 1,899 | 1,375 | 1,254 | 1,036 | 8,638 | 494 | 1,440 |
| 717 | 682 | 1,000 | 981 | 942 | 997 | 5,319 | 1,665 | 886 |
| 457 | 374 | 500 | 600 | 727 | 850 | 3,508 | 285 | 585 |
| 1,530 | 1,050 | 857 | 1,199 | 1,343 | 1,400 | 7,379 | 225 | 1,230 |
| 344 | 272 | 319 | 400 | 312 | 500 | 2,147 | 148 | 358 |
| 498 | 365 | 459 | 500 | 500 | 500 | 2,822 | 52 | 470 |
| 6,067 | 4,461 | 5,834 | 5,855 | 5,878 | 6,083 | 34,178 | 3,737 | 5,696 |
| 3,099 | 2,298 | 2,999 | 2,900 | 3,000 | 3,000 | 17,296 | 366 | 2,883 |
| 2,350 | 1,801 | 2,282 | 2,200 | 1,997 | 2,100 | 12,730 | 308 | 2,122 |
| 4,100 | 3,749 | 4,338 | 4,200 | 3,800 | 4,500 | 24,687 | 154 | 4,113 |
| 9,549 | 7,848 | 9,619 | 9,300 | 8,797 | 9,600 | 54,713 | 828 | 9,118 |
| 247 | 181 | 250 | 250 | 250 | 267 | 1,445 | ... | 241 |
| 315 | 240 | 313 | 450 | 598 | 799 | 2,715 | ... | 452 |
| ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 562 | 421 | 563 | 700 | 848 | 1,066 | 4,160 | ... | 693 |
| 1,381 | 1,069 | 1,456 | 1,510 | 1,464 | 1,808 | 8,688 | 648 | 1,448 |
| 500 | 375 | 360 | 346 | 404 | 494 | 2,479 | 288 | 413 |
| 1,062 | 652 | 996 | 1,000 | 1,000 | 1,500 | 6,210 | 471 | 1,035 |
| 2,943 | 2,096 | 2,812 | 2,856 | 2,868 | 3,802 | 17,377 | 1,407 | 2,896 |
| 810 | 705 | 936 | 857 | 932 | 989 | 5,229 | 168 | 872 |
| 862 | 824 | 677 | 1,128 | 1,240 | 1,355 | 6,086 | 473 | 1,014 |
| 122 | 104 | 122 | 144 | 194 | 300 | 986 | 29 | 164 |
| 1,794 | 1,633 | 1,735 | 2,129 | 2,366 | 2,644 | 12,301 | 670 | 2,050 |
| 456 | 405 | 381 | 556 | 767 | 712 | 3,277 | 596 | 546 |
| 1,036 | 694 | 702 | 889 | 890 | 900 | 5,111 | 205 | 852 |
| 424 | 346 | 849 | 500 | 629 | 594 | 3,342 | 208 | 557 |
| 1,916 | 1,445 | 1,932 | 1,945 | 2,286 | 2,206 | 11,730 | 1,009 | 1,955 |
| 612 | 554 | 545 | 565 | 978 | 845 | 4,099 | 106 | 683 |
| 501 | 700 | 700 | 600 | 700 | 899 | 4,100 | 318 | 683 |
| 584 | 446 | 769 | 630 | 576 | 600 | 3,605 | 564 | 601 |
| 1,697 | 1,700 | 2,014 | 1,795 | 2,254 | 2,344 | 11,804 | 988 | 1,967 |
| 67,829 | 52,942 | 65,811 | 70,951 | 66,588 | 71,315 | 3,95,436 | 40,630 | 65,904 |
| ... | ... | 677 | 573 | 73 | 73 | ... | ... | ... |
| ... | ... | | | 495 | 436 | ... | ... | ... |
| 370 | ... | ... | 400 | 400 | ... | ... | ... | ... |
| 100 | 400 | 400 | 250 | 350 | 548 | ... | ... | ... |
| 68,299 | 53,342 | 66,888 | 72,174 | 67,906 | 72,372 | 3,95,436 | 40,630 | 65,904 |

# APPENDIX C.

*Statement showing the condition of Usar plots under experiment in the N.-W. P. and Oudh.*

| District. | Serial number of plot. | Situation of plot. | Area in acres. | Date of commencement of treatment. | Method of treatment. | Summary of remarks by Irrigation Department. |
|---|---|---|---|---|---|---|
| **I.—Under the Irrigation Department.** | | | | | | |
| Aligarh ... | 1 | At Pardilnagar, opposite the 24th mile of the Sikandra Rao Distributary, Ganges Canal, (*Plot A*). | 10·8 | 1868 ... | Holes three feet in diameter at top and two feet at bottom, and three feet deep were dug at 10 feet intervals and filled with canal silt, which was raised about nine inches above the ground level. Of the 3,937 beds thus prepared, 238 were sown with babúl seeds; in the remaining 3,699 trees of various kinds—shisham, siras, jámun, &c, were planted, the trees being from three to five feet in height, and a few babúl seeds were sown round the transplants. During the rains of 1874 coarse grass (*dáb*) was planted between the trees in lines one foot apart. From November 1874 to June 1875, the plantation was flooded about twice a month. From June 1875 to December 1879, it is believed that it was not irrigated. From January 1880 up to date the grass has been occasionally watered. There are at present 735 trees on this plot, of which 321 are small. The larger trees are very unhealthy. No expenditure was incurred in the year under report, and there were no receipts from grass, as no one would buy it. This plot forms with plots B and C an oblong, and a permanent wire fence for the whole has now been sanctioned at a cost of Rs. 645. | The total expenditure up to 30th September 1890 and receipts are as follows :—<br>Rs.<br>Probable expenditure in 1868 ... ... ... 600<br>Ditto 1881 ... ... ... 660<br>Total ... 1,260<br>Interest on the former for 21 years at Rs. 5 per cent. per annum, 630<br>Ditto latter for nine years at Rs. 5 per cent. per annum, 297<br>Expenditure from April 1889 to September 1890 ... ... 269<br>Interest on above say for one year at Rs. 5 per cent. per annum, 13<br>Total expenditure ... 2,469<br>The total receipts up to date by sale of grass have only been Rs. 45, and adding to this the value of trees now in the plantation, which may approximately be taken at Rs. 150, the expenditure exceeds the receipts by Rs. 2,274.<br>The Executive Engineer under the circumstances does not expect that the experiments will achieve any successful results.<br>The Sub Engineer adds:—<br>"The kikars in plot No. A are very sickly and a number are dead; the rest of the trees are healthy; the bamboo clumps have not thrived at all during the year. There were no sales of wood from the plantation during the year.<br>"The babul trees in the plantation will never come to anything; as soon as the top root touches the kankar stratum, which is about three feet below surface of ground, the bark commences to crack and within three years the tree dies." |
| | 2 | At Pardilnagar (*Plot B*). Adjoins Plot A. | 11 | 1881 ... | In half of this plot ridges were prepared one foot high and 10 feet apart, and were sown with kikar seed. The sowings failed, except in a few places where the soil was good. | |

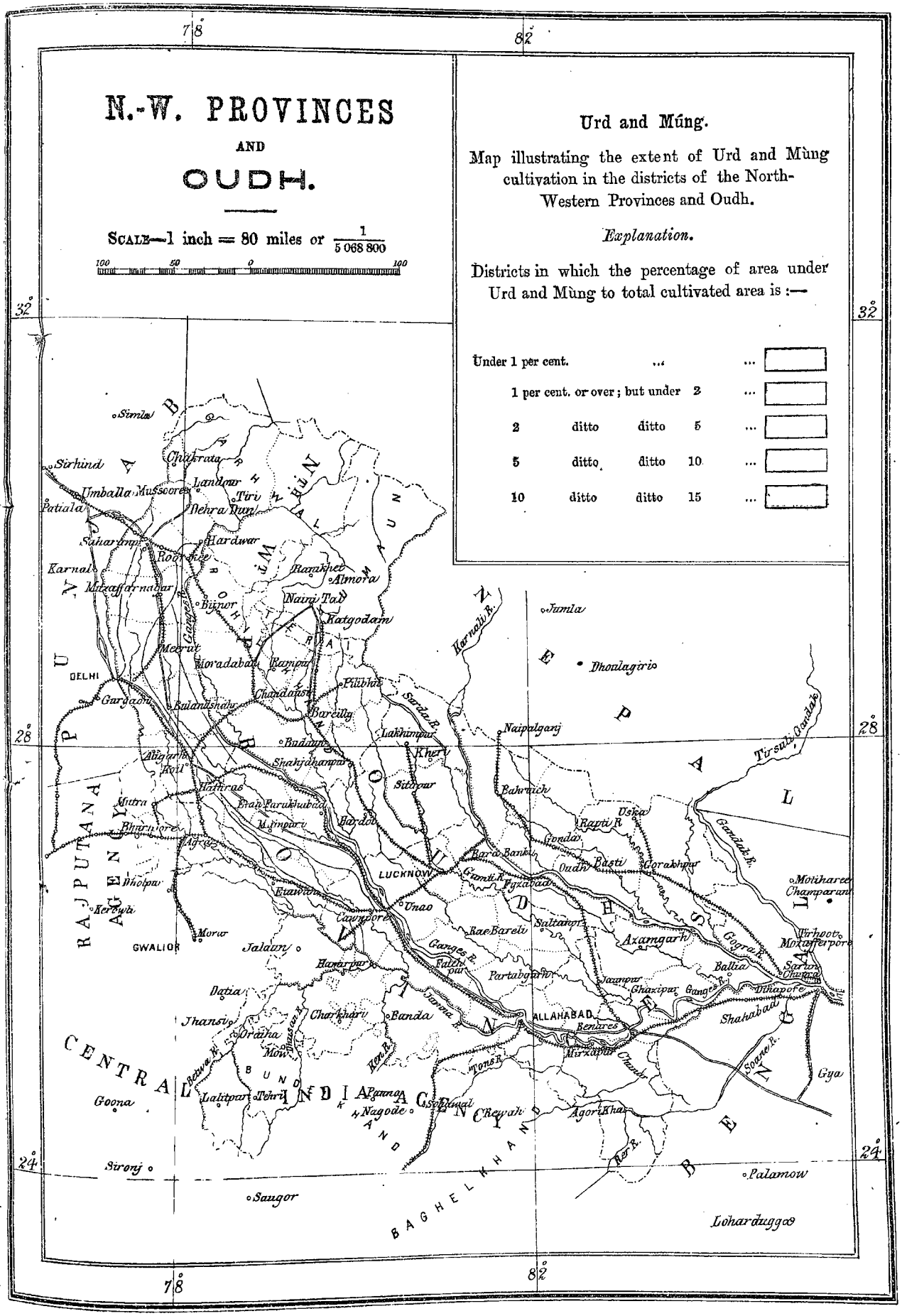
| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | | | | | | In the other half seed-beds were prepared by digging holes three feet in diameter and three to four feet deep and 10 feet apart, the soil of one hole being thrown into the next, so as to invert it; 1,264 beds thus prepared were sown with kikar seeds, but the rains of 1881 were rather unfavourable, and half of the young trees died. In the following year beds were prepared 20 feet apart in the part that had been prepared in ridges. These beds as well as those in which seeds had failed in 1881, had babúl seed sown in them; but fully half failed. There are now 88 kikar trees of some size and 460 young plants. | |
| Ditto ... | 3 | Ditto (*Plot C*) ... Adjoins Plots A and B. | 2·5 | 1884 ... | | Seed-beds, three feet wide, three feet deep and ten feet apart, were prepared. A nursery of reonja, chaunkar and kikar was started in February 1884, and the young plants were put out into the seed-beds at the commencement of the rains, 659 of each kind. The plants throve well till the beginning of October, when abnormally heavy rain fell in the Aligarh district. The plantation and whole country round it was flooded, and most of the plants died. This plot has not been irrigated. | |
| Etáwah ... | 4 | At Takrau Bridge in mile 35 furlong 2, Etáwah Branch, Ganges Canal. | 60·13 | December, 1873. | | About 40 acres of land were enclosed by an embankment. During 1874 the water of the Takrau Distributary was run over this plot for four months; silt varying in depth from three feet to four inches, was deposited over the lower portion. The flooding has since been repeated. In May 1875, the plot was leased for three years, the lessee paying Rs. 25 the first year, and Rs. 33-5-4 for each of the succeeding years. He was allowed water free for the crops grown on the reclaimed land. In October 1876, the silt accumulated on the left bank of the distributary was levelled off and spread over the adjacent úsar to a distance of about 250 feet, the work being done by the lessee in lieu of that year's rent; the land thus reclaimed is over four acres in area. In 1883 it was reported that 33 acres were fairly productive; the rest it is difficult to silt from want of command. Part of the tract is as high as canal full supply, and this is still úsar. | *Takrau.*—This farm is leased to two tenants, who together pay an annual rent of Rs. 96, free of water-rate.<br>During the last two fasls six bighas, nine biswas were sown with wheat and barley and 22 bighas, 1 biswa with rice.<br>The value of water supplied was Rs. 77-7-11. The net revenue for the year may therefore be taken as Rs. 18-8-1, which is equivalent to 4½ per cent. on the capital expended, *viz.*, Rs. 416. The total rent receipts from the commencement of operations are Rs. 1,241; and the direct expenditure is Rs. 416. This shows a net profit of Rs. 825. In this calculation, however, the value of the canal water supplied is not taken into account. |

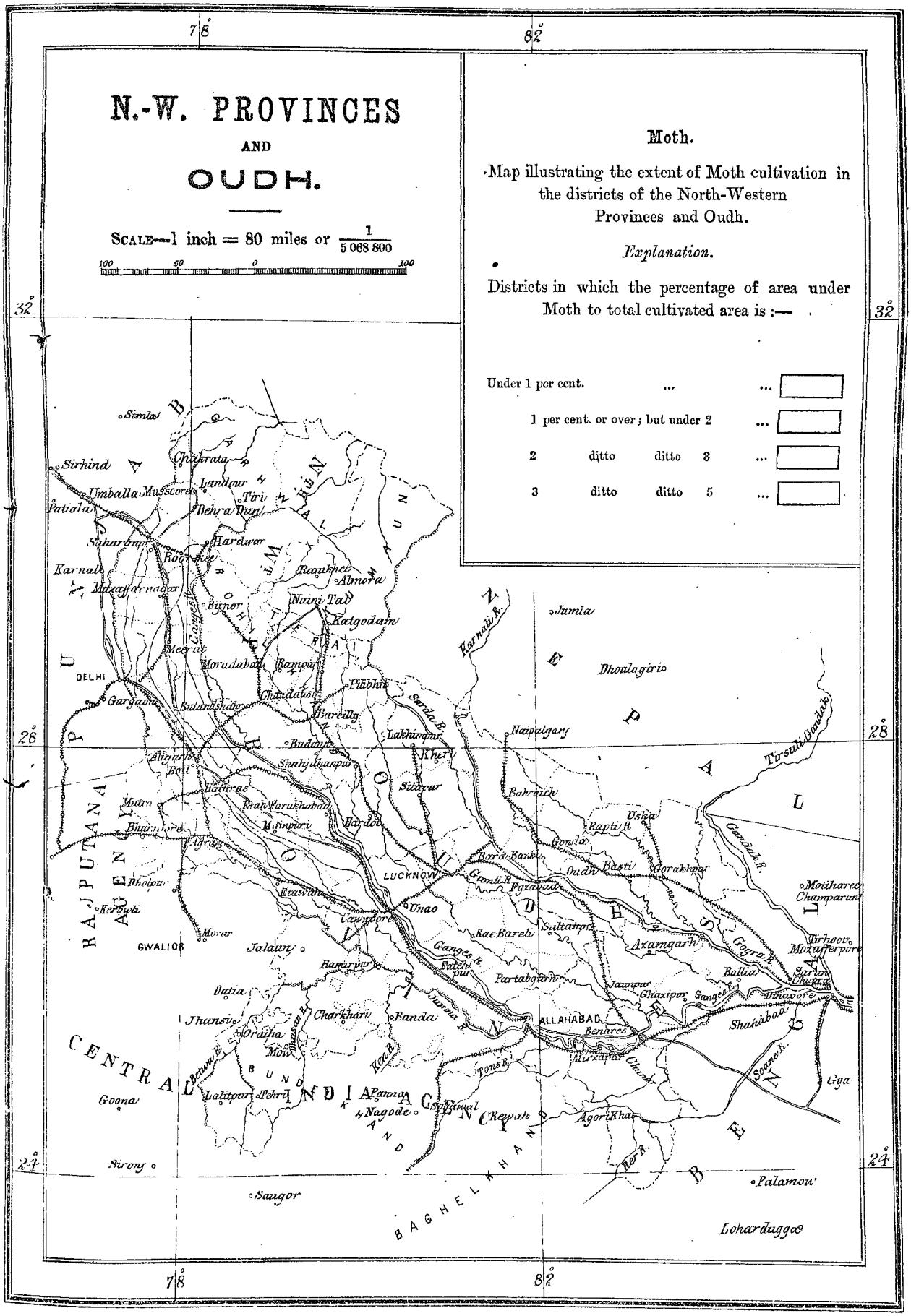
| District. | Serial number of plot. | Situation of plot. | Area in acres. | Date of commencement of treatment. | Method of treatment. | Summary of remarks by Irrigation Department. |
|---|---|---|---|---|---|---|
| Etáwah ... | 5 | At Khandan Bridge in mile 78 furlong 5, Etáwah Branch, Ganges Canal. | 11·21 | 1883 ... | Compensation for the plot was estimated by the Collector at Rs. 9 per acre. There were some cultivated patches distributed over the úsar. The level of the ground was two to three feet below full supply level on the canal, and there is now a deposit of silt over most of the area. | *Khandan.*—The total expenditure has been Rs. 574-13-1. As no tenant could be induced to take up the cultivation of the Kandhon silt farm, the Deputy Magistrate was directed to sow a portion of it with rabi crops. The experiment, however, resulted, chiefly owing to the difficulty of keeping off cattle, in a net loss (after deducting water rate) of Rs. 11-1-1.<br>In the rains the grass on the farm was sold for Rs. 3, the net loss for the year was therefore Rs. 8-1-1.<br>A man has lately offered to lease this farm from 15th October, for a term of three or four years ; the amount offered is small, but a higher figure is likely to be obtained when the lease falls in, as the ground will then be in a better condition for cultivation. |
| Ditto ... | 6 | Near the Turaia Bridge, mile 55 furlong 6, Etáwah Branch, Ganges Canal. | 21·4 | ... | ... | *Turaia.*—The total expenditure at Turaia has been Rs. 892-7-2. Where the land was covered with silt and raised above water level, by levelling off the left bank of the Khandheri distributary an attempt was made to sow bajra in kharif of 1889. The tenant agreed to pay Rs. 4 for the patch (about three acres in extent), free of water-rate. The value of water supplied was approximately Rs. 5. The crop, however, was not successful, and no tenant could be found to cultivate the land this year. |

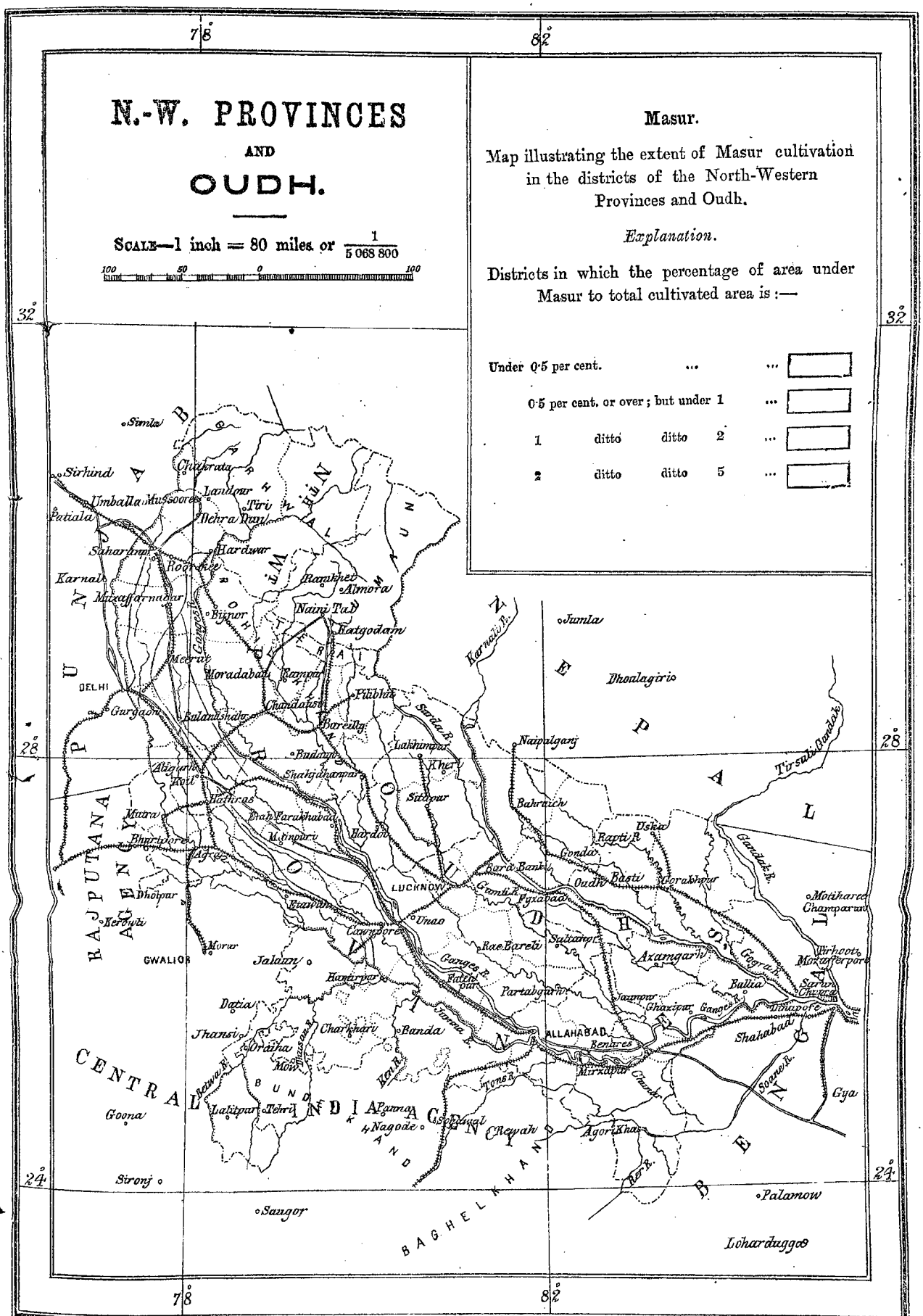
| District. | Serial number of plot. | Situation of plot. | Area in acres. | Date of commencement of treatment. | Method of treatment. | Result of inspection by Director, Botanicial Department, 1889-90. |
|---|---|---|---|---|---|---|
| **II.—Under the Dept. of Land Records and Agriculture.** | | | | | | |
| Cawnpore ... | 7 | Juhi, a plain five miles from Cawnpore. | 102·25 | July 1882 ... | A.—*Preservation and extension of natural grasses.*—The plain has for this purpose been enclosed partly by wire fence and partly by a ditch: cattle are thus kept off and grazing strictly forbidden except on one plot, to which sheep are purposely admitted at certain intervals. On another plot of equal size to this latter grass is cut by sickles; while on a third plot the grass is scraped in the ordinary manner by *khurpi* (hand-hoe). On the rest of the plain grasses are at present allowed to strike root and spread over the land. Measured strips of land are marked out by wooden pegs with a view to watching closely such botanical changes as may take place in the herbage.<br>B.—*Plantation of fuel and fodder trees.*—A large number of babúl (*Acacia arabica*), dhák (*Butea frondosa*), ber (*Zizyphus*), nim (*Melia Indica*), shisham (*Dalbergia sissu*), siras (*albizzialebleck*), pipal (*Ficus religiosa*), gular (*Ficus glomerata*), bargad (*Ficus Indica*), and other hardy indigenous trees, as well as a number of exotic plants, such as salt-bush, sheep-bush, rain-tree, &c., have been planted from time to time after the following methods:—<br>(1) On slightly elevated spots where grass of a superior kind exists, and soil has not been washed away by erosion.<br>(2) On sides of mounds artificially raised, which offer protection to the plants when very young, from hot winds, seeds being planted on the sheltered side of the mound.<br>(3) In pits of the following description:—<br>(*a*) dug five feet deep, lined with Willesden rotproof paper, and filled with good soil from cultivated land;<br>(*b*) dug to the same depth, but refilled with the same soil and without any lining.<br>C.—*Manure*.—To the worst piece of úsar that could be selected gypsum and farmyard manure have been applied. | *Square No.* 1.—A patch of *dub* grass measured in January 1888 19½ × 6½ feet has now increased to 30 × 12 feet. There were several bare patches in this square two years ago, they are now completely covered with grass.<br>*Square No.* 3.—A bare patch, which was 30 feet wide in November 1889, has diminished to 22 feet.<br>*Square No.* 4.—Some paper mulberry plants here have grown about four feet since November 1889.<br>*Square No.* 6.—A patch of dhaman grass (*Cenchrus pennisetiformis*) measured 24½ × 15 feet in January 1888, has now increased to 30 × 18 feet.<br>*Square No.* 8.—There was a thick deposit of reh salt here in January 1888, it is now nearly covered over with grass.<br>*Square No.* 11.—There was a bare efflorescent patch which measured 10 × 7 feet in January 1888, it was much reduced in size in November 1889, and is now nearly covered with grass.<br>*Square No.* 17.—A bare patch, measuring 19 × 6 feet. was recorded in November 1888, it was much diminished in size in November 1889, and is now almost covered. |

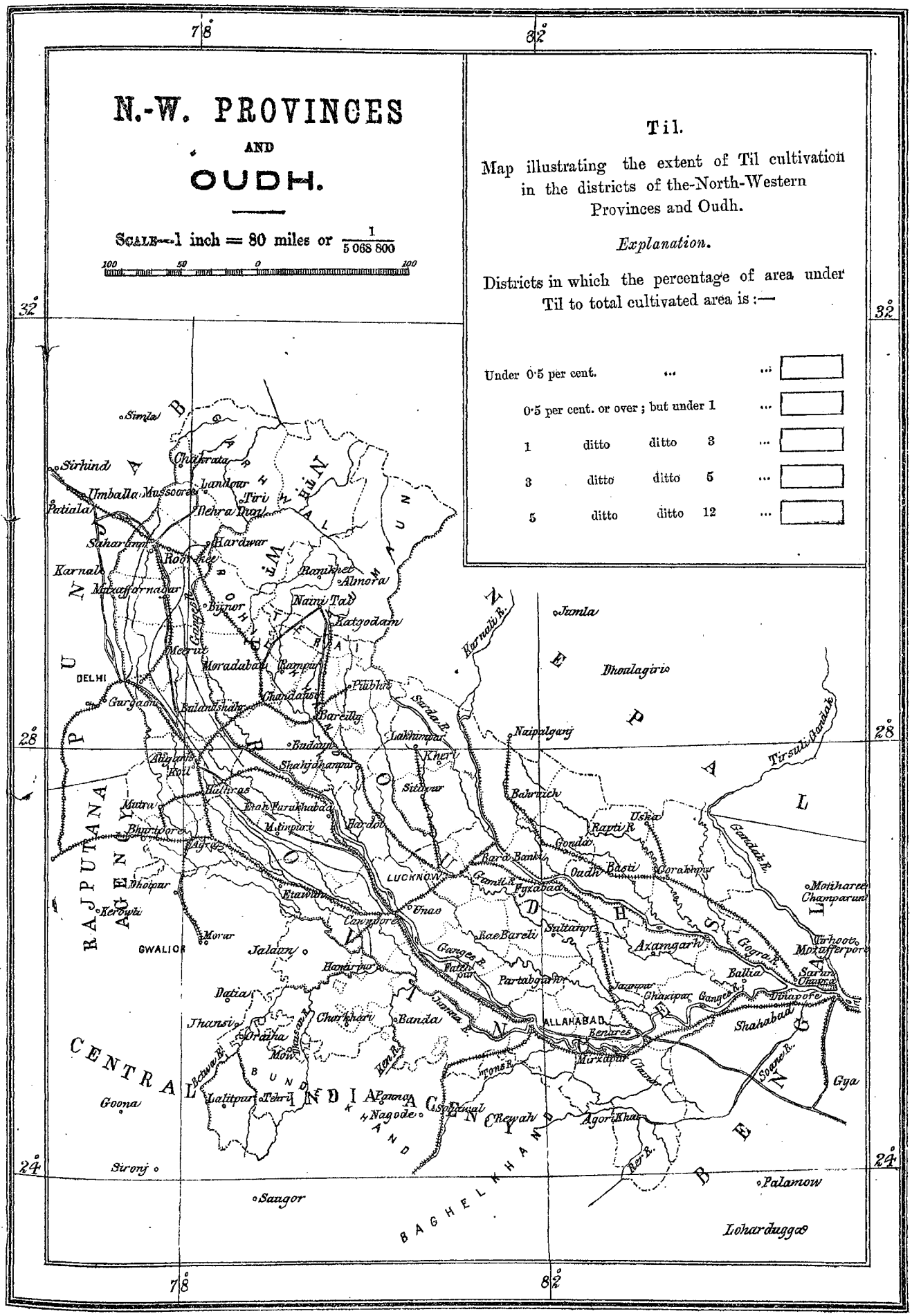
| District. | Serial number of plot. | Situation of plot. | Area in acres. | Date of commencement of treatment. | Method of treatment. | Result of inspection by Director, Botanical Department, 1889-90. |
|---|---|---|---|---|---|---|
| Cawnpore ... | | Amramau, a plain four miles from Cawnpore. | 52 | July 1882 ... | This plain is managed entirely on commercial principles. A number of cattle and sheep are kept: they are fed on the grasses which grow on the plain and on the produce of a portion of the reclaimed land; their milk is sold, and the manure applied to the land, which is constantly kept under plough, and, as soon as capable of bearing a crop, let out to the neighbouring cultivators at reasonable rates. | |
| Aligarh .... | 9 | Gursikran, a plain seven miles from Aligarh. | 718 | August 1885, | This plain is treated much like No. 7 (Juhi). It has been protected from cattle by a ditch, and the grasses allowed to grow and cover the plain. A nursery is maintained to grow both indigenous and exotic plants, which are planted out where soil is tolerably good. The object in the case of this plain is to ascertain whether by excluding cattle for a number of years, the natural grasses have any chance of obtaining a permanent footing, and to find out which trees do best on a tolerably good class of úsar land. | Mr. Duthie, after describing in detail the changes observed in each of the squares marked out for observation in Gursikran and Cherat, remarks:—"It may be assumed from the facts above stated that the condition of the surface soil within these enclosed areas continues to improve, and that this improvement has been brought about by a chain of circumstances originating as the result of protections by enclosure.<br>By this means the grass vegetation has escaped the injuries caused by the constant tread of cattle, and at the same time has profited by the retention and decay *in situ* of a large amount of vegetable matter which is ordinarily removed by grazing animals upon unprotected areas.<br>The action of the roots of healthy plants is a very efficient mechanical agency for improving the texture of such an impervious soil as that of the úsar tracts.<br>Protection by enclosure appears therefore to be the best as well as the least expensive preliminary operation towards effecting reclamation. The record of periodical observations undertaken during the last few years shows that the grass vegetation has been steadily encroaching on, and in many instances has completely clothed, certain portions which were bare and efflorescent at the time when the ground was first taken up and enclosed; also that patches of *dub* and other high-class fodder grasses have increased in size and are to a great extent replacing the coarser kinds of grasses.<br>The condition of the soil within these reserves, as in all reh-infected land, is very unequal as to quality and texture, but as far as one can judge from outward appearances, I should say that large proportions of each reserve is now ready for what may be considered the secondary stage of operations towards reclamation, *viz.*, such as the Assistant Director, Mir Muhammad Husain, has so successfully carried out at Amramau and has already with favorable prospects commenced on a portion of the Cherat reserve." |
| Ditto ... | 10 | Cherat, a plain five miles from Aligarh. | 242 | Ditto ... | This plain has been divided in two parts, one of which is treated exactly like No. 8 (Amramau). The following experiments are conducted in the other part. The whole is protected against cattle by a fencing of barbed wire:—<br>(1) Fuel and fodder trees are planted as in No. 9 (Gursikran.)<br>(2) The natural grasses are preserved and allowed to spread undisturbed.<br>(3) Exotic grasses are sown.<br>(4) A plot of about 25 acres is flushed with canal water in view to raising meadow grasses.<br>(5) An embankment has been raised round a piece of low land measuring about 15 acres in order to retain storm-water, and to see whether the land can thus be rendered fit for rice cultivation.<br>(6) The surface of a plot measuring 2·5 acres and yielding an efflorescence of *reh* is annually scraped to test the rate and rapidity of formation of such efflorescences. | |

# APPENDIX D.

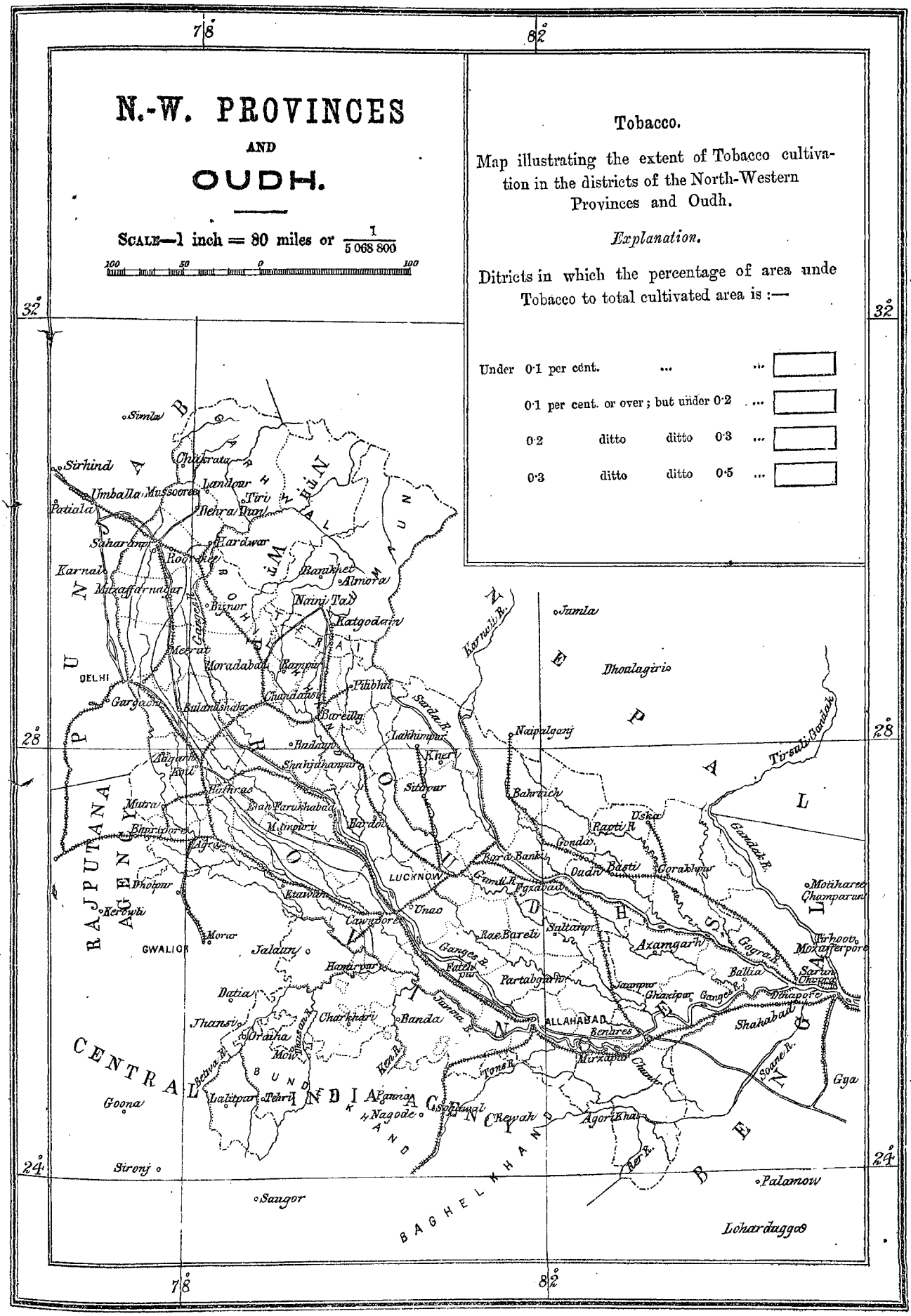

N.-W. PROVINCES
AND
OUDH.
SCALE—1 inch = 80 miles or 1/5 068 800
100 50 0 100
Urd and Múng.
Map illustrating the extent of Urd and Mùng cultivation in the districts of the North-Western Provinces and Oudh.
Explanation.
Districts in which the percentage of area under Urd and Mùng to total cultivated area is :—
Under 1 per cent. ... ...
1 per cent. or over; but under 2 ...
2 ditto ditto 5 ...
5 ditto ditto 10 ...
10 ditto ditto 15 ...
78°
82°
32°
28°
24°
Simla
Sirhind
Umballa
Patiala
Mussoorie
Chakrata
Landour
Tiri
Dehra Dun
Saharanpur
Hardwar
Roorkee
Karnal
Muzaffarnagar
Bijnor
Ranikhet
Almora
Naini Tal
Katgodam
Meerut
Moradabad
Rampur
Pilibhit
DELHI
Gurgaon
Bulandshahr
Chandausi
Bareilly
Budaun
Shahjahanpur
Lakhimpur
Kheri
Sitapur
Aligarh
Koil
Hathras
Etah Farukhabad
Mainpuri
Hardoi
Mutra
Bhurtpore
Agra
Dholpur
Kerowli
Morar
GWALIOR
Jalaun
Etawah
Cawnpore
Unao
LUCKNOW
Gumti R.
Fyzabad
Bara Banki
Gonda
Oudh
Basti
Gorakhpur
Rapti R.
Uska
Bahraich
Naipalganj
Jumla
Dhoulagiri
Karnali R.
Sarda R.
Tirsuli Gandak
Gandak R.
Motiharee
Champaran
Tirhoot
Mozufferpore
Sarun
Chupra
Dinapore
Ballia
Gogra R.
Azamgarh
Jaunpur
Ghazipur
Ganges R.
Shahabad
Gya
Soane R.
Rae Bareli
Sultanpur
Partabgarh
Fatehpur
Hamirpur
Datia
Jhansi
Oraiha
Mow
Charkhari
Banda
Jumna R.
Ken R.
Betwa R.
Dhusan R.
Lalitpur
Tehri
Panna
Nagode
Sohawal
Rewah
Agori Khas
Tons R.
Chunar
Mirzapur
Benares
ALLAHABAD
Goona
Sironj
Saugor
Palamow
Lohardugga
PUNJAB
NEPAL
BENGAL
CENTRAL INDIA AGENCY
RAJPUTANA AGENCY
BAGHELKHAND
BUNDELKHAND
ROHILKHAND
TERAI
GARHWAL
NEPAL
OUDH
ROHILKHAND
BENGAL


N.-W. PROVINCES
AND
OUDH.
SCALE—1 inch = 80 miles or 1/5 068 800
100 50 0 100
Moth.
Map illustrating the extent of Moth cultivation in the districts of the North-Western Provinces and Oudh.
Explanation.
Districts in which the percentage of area under Moth to total cultivated area is :—
Under 1 per cent. ... ...
1 per cent. or over; but under 2 ... ...
2 ditto ditto 3 ... ...
3 ditto ditto 5 ...
78°
82°
32°
28°
24°
Simla
Sirhind
Umballa
Patiala
Musscoree
Landour
Tiri
Dehra Dun
Saharanpur
Hardwar
Roorkee
Karnal
Muzaffarnagar
Bijnor
Ramghur
Almora
Naini Tal
Katgodam
Meerut
Moradabad
Rampur
DELHI
Gurgaon
Bulandshahr
Chandausi
Pilibhit
Bareilly
Budaun
Shahjahanpur
Lakhimpur
Kheri
Aligarh
Etah
Sitapur
Mutra
Bhurtpore
Agra
Etawah
Farrukhabad
Mynpuri
Hardoi
Dholpur
Kerowli
LUCKNOW
Unao
Cawnpore
GWALIOR
Morar
Jalaun
Hamirpur
Fatehpur
Rae Bareli
Sultanpur
Partabgarh
Datia
Jhansi
Oraiha
Charkhari
Banda
ALLAHABAD
Benares
Jaunpur
Ghazipur
Ballia
Shahabad
Goona
Lalitpur
Pahri
Nagode
Sohagpur
Rewah
Agori Khas
Sirony
Sangor
Palamow
Lohardugga
Jumla
Dhoulagiri
Karnali R.
Naipalgani
Tirsuli Dandak
Bahraich
Uska
Rapti R.
Gonda
Bara Banki
Oudh
Basti
Gorakhpur
Gandak R.
Motiharee
Champarun
Gogra R.
Tirhoot
Muzafferpore
Sarun
Chupra
Ganges R.
Jumna R.
Soane R.
Gya
Betwa R.
Ken R.
Tonse R.
Ner R.
Gunti R.
Fyzabad
Axamgarh
Mirzapur
Chunar
Sarda R.
RAJPUTANA AGENCY
CENTRAL INDIA AGENCY
BUNDELKHAND
BAGHELKHAND

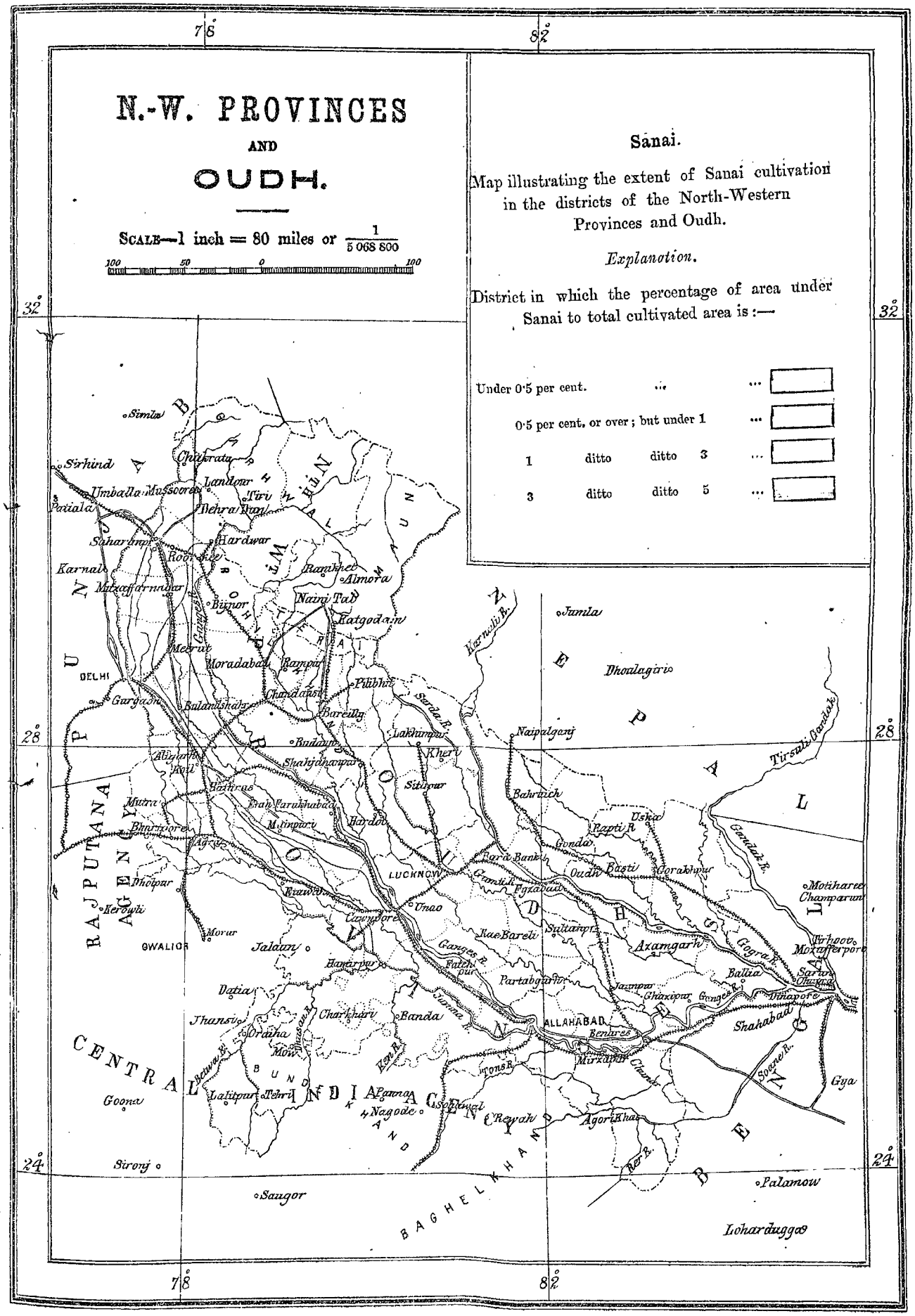

N.-W. PROVINCES
AND
OUDH.
SCALE—1 inch = 80 miles or 1/5 068 800
100 50 0 100
Masur.
Map illustrating the extent of Masur cultivation in the districts of the North-Western Provinces and Oudh.
Explanation.
Districts in which the percentage of area under Masur to total cultivated area is :—
Under 0·5 per cent. ...
0·5 per cent. or over; but under 1 ...
1 ditto ditto 2 ...
2 ditto ditto 5 ...
78°
82°
32°
28°
24°
Simla
Sirhind
Umballa
Mussooree
Patiala
Landour
Tiri
Mehra Dun
Saharanpur
Hardwar
Roorkee
Karnal
Muzaffarnagur
Bijnor
Ramghee
Almora
Naini Tal
Kotgodam
Meerut
Moradabad
Rampur
DELHI
Gurgaon
Bulandshahr
Chandausi
Pilibhit
Bareilly
Budaun
Shahjahanpur
Aligarh
Etah
Hathras
Mutra
Etah Farukhabad
Mainpuri
Bhurtpore
Agra
Dholpur
Etawah
Kerowli
LUCKNOW
Unao
Cawnpore
Morar
GWALIOR
Jalaun
Hamirpur
Fatihpur
Rae Bareli
Sultanpur
Partabgarh
Jaunpur
Ghazipur
Ganges R.
Ballia
Dinapore
Shahabad
Datia
Jhansi
Charkhari
Banda
ALLAHABAD
Benares
Mirzapur
Chunar
Soane R.
Gya
Oraiha
Mow
Lalitpur
Tehri
Panna
Nagode
Rewah
Agori Khas
Sirohj
Sangor
Palamow
Lohardugga
Jumla
Dhoalagiri
Karnali R.
Naipalgarj
Tirsuli Bamdak
Bahraich
Rapti R.
Gonda
Oudh
Basti
Gorakhpur
Gunduk R.
Motiharee
Champarun
Dhaiyoree
Sarun
Chuprah
Goggra R.
Axangarh
Birhoot
Muzufferpore
Ken R.
Betwa R.
Tonse R.
Sone R.
Bar R.
BAGHELKHAND
BUNDELKHAND
CENTRAL INDIA AGENCY
RAJPUTANA AGENCY
PUNJAB
HIMALAYAN MOUNTAINS
OUDH
ROHILCUND
DOAB
DELHI


N.-W. PROVINCES
AND
OUDH.
SCALE—1 inch = 80 miles or 1/5 068 800
100 50 0 100
Til.
Map illustrating the extent of Til cultivation in the districts of the North-Western Provinces and Oudh.
Explanation.
Districts in which the percentage of area under Til to total cultivated area is:—
Under 0·5 per cent. ... ...
0·5 per cent. or over; but under 1 ... ...
1 ditto ditto 3 ...
3 ditto ditto 5 ...
5 ditto ditto 12 ...
78°
82°
32°
28°
24°
Simla
Sirhind
Umballa
Mussoorie
Landour
Patiala
Chakrata
Tiri
Dehra Doon
Saharunpur
Hardwar
Karnal
Muzaffarnagar
Roorkee
Ramipur
Almora
Naini Tal
Bijnor
Katgodam
Meerut
Moradabad
Rampur
DELHI
Gurgaon
Baldeo Shahr
Chandausi
Pilibhit
Bareilly
Badaun
Lakhimpur
Kheri
Naipalganj
Aligarh
Hatras
Shahjahanpur
Sitapur
Bahraich
Mutra
Etah
Farakhabad
Mainpuri
Hardoi
Tirsuli
Bhadak
Bhurtpore
Agra
Rapti R.
Gonda
Ganduk R.
Dholpur
LUCKNOW
Gumti R.
Fyzabad
Oudh
Basti
Gorakhpur
Motiharee
Champarun
Etawah
Cawnpore
Unao
Rae Bareli
Sultanpur
Kerowli
Morar
GWALIOR
Jalaun
Ganges R.
Hamirpur
Fattehpur
Partabgarh
Azamgarh
Gogra R.
Tirhoot
Muzafferpore
Ballia
Sarun
Chuprah
Datia
Jaunpur
Ghazipur
Ganges R.
Ghazipore
Jhansi
Charkhari
Banda
Jumna R.
ALLAHABAD
Benares
Shahabad
Oraiha
Mow
Betwa R.
Ken R.
Mirzapur
Soane R.
Gya
Lalitpur
Tehri
Goona
Nagode
Rewah
Agori Khas
Son R.
Sironj
Palamow
Sangor
Lohardugga
HIMALAYAN MOUNTAINS
BOHILKHAND
RAJPUTANA AGENCY
CENTRAL INDIA AGENCY
BUNDELKHAND
BAGHELKHAND
NEPAL
Jumla
Dhoulagiri
Hornali R.

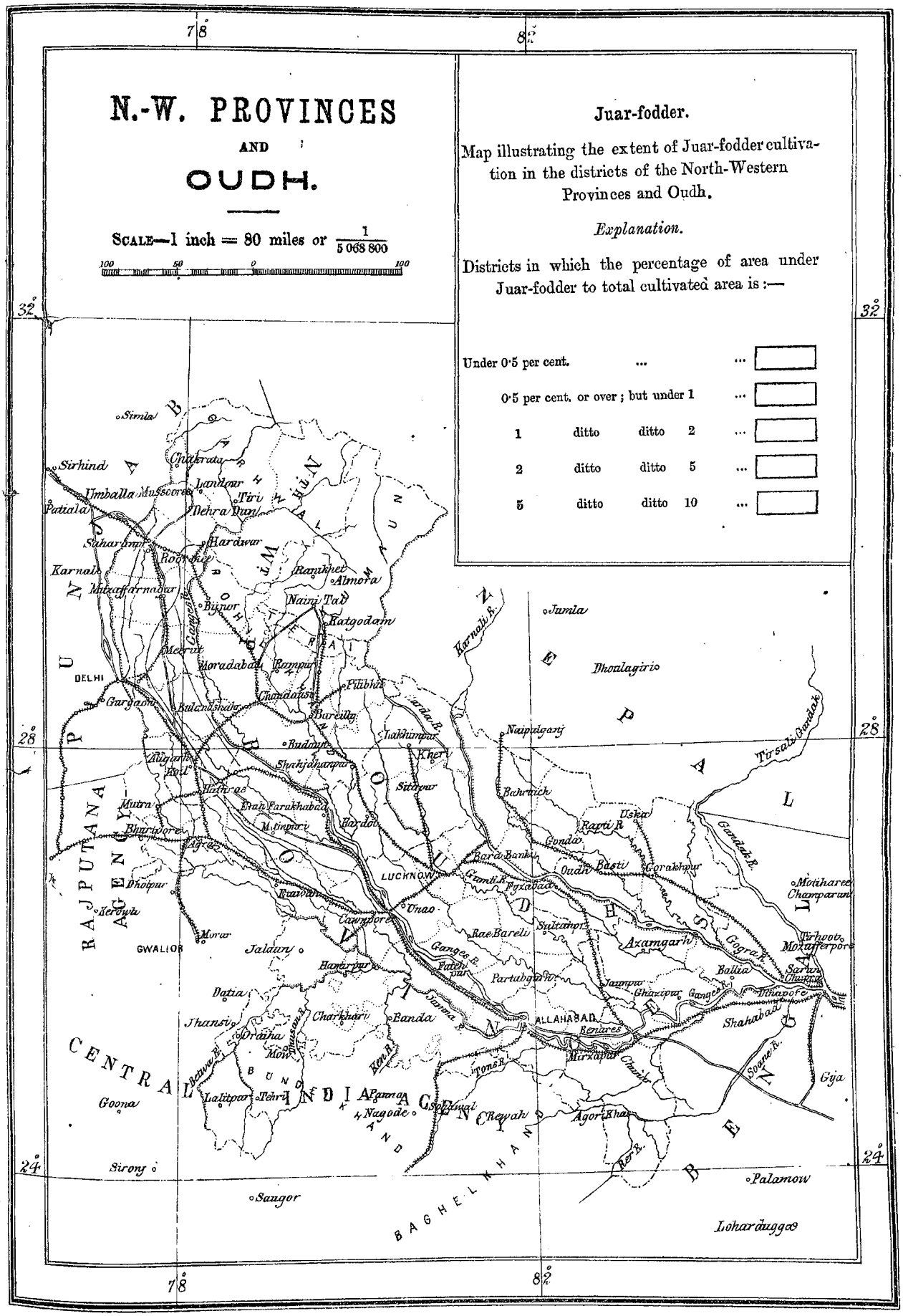
APPENDIX D.


N.-W. PROVINCES
AND
OUDH.
SCALE—1 inch = 80 miles or 1/5 068 800
100 50 0 100
Tobacco.
Map illustrating the extent of Tobacco cultivation in the districts of the North-Western Provinces and Oudh.
Explanation.
Ditricts in which the percentage of area unde Tobacco to total cultivated area is :—
Under 0·1 per cent. ... ...
0·1 per cent. or over; but under 0·2 ...
0·2 ditto ditto 0·3 ...
0·3 ditto ditto 0·5 ...
78°
82°
32°
28°
24°
Simla
Sirhind
Umballa
Mussoorie
Patiala
Chakrata
Landour
Tiri
Dehra Dun
Saharanpur
Hardwar
Roorkee
Karnal
Muzaffarnagar
Bijnor
Ranikhet
Almora
Naini Tal
Katgodam
Meerut
Moradabad
Rampur
Pilibhit
DELHI
Gurgaon
Bulandshahr
Chandausi
Bareilly
Budaun
Lakhimpur
Kheri
Shahjahanpur
Sitapur
Aligarh
Kol
Hathras
Mutra
Bhurtpore
Agra
Mainpuri
Hardoi
Bahraich
Naipalganj
Jumla
Dhoulagiri
Tirsuli Gandak
Uska
Rapti R.
Gonda
Basti
Gorakhpur
Oudh
Bara Banki
Fyzabad
LUCKNOW
Dholpur
Kerowli
Etawah
Unao
Cawnpore
Rae Bareli
Sultanpur
Azamgarh
Motiharee
Champarun
Tirhoot
Mozufferpore
Morar
GWALIOR
Jalaun
Hamirpur
Fatehpur
Partabgarh
Jaunpur
Ghazipur
Ballia
Sarun
Chapra
Dinapore
Datia
Jhansi
Charkhari
Banda
ALLAHABAD
Benares
Shahabad
Oraiha
Mirzapur
Mow
Lalitpur
Tehri
Panna
Nagode
Rewah
Agori Khas
Goona
Sironj
Saugor
Palamow
Lohardugga
Gya
Karnali R.
Sarda R.
Gandak R.
Gogra R.
Ganges R.
Jumna R.
Ken R.
Betwa R.
Tons R.
Soane R.
Rer R.
PUNJAB
NEPAL
BENGAL
RAJPUTANA AGENCY
CENTRAL INDIA AGENCY
BAGHELKHAND
BUNDELKHAND
ROHILKHAND
TERAI
GARHWAL
NAINI TAL
MAUN
OUDH
NORTH WESTERN PROVINCES

APPENDIX D.


N.-W. PROVINCES
AND
OUDH.
SCALE—1 inch = 80 miles or 1/5 068 800
100 50 0 100
Sanai.
Map illustrating the extent of Sanai cultivation in the districts of the North-Western Provinces and Oudh.
Explanation.
District in which the percentage of area under Sanai to total cultivated area is :—
Under 0·5 per cent. ... ...
0·5 per cent. or over ; but under 1 ...
1 ditto ditto 3 ...
3 ditto ditto 5 ...
78°
82°
32°
28°
24°
Simla
Sirhind
Umballa
Patiala
Mussoorie
Chakrata
Landour
Tiri
Dehra Dun
Saharanpur
Hardwar
Roorkee
Karnal
Mozaffarnagar
Bijnor
Ranikhet
Almora
Naini Tal
Ratgodam
Meerut
Moradabad
Rampur
Pilibhit
Chandausi
Bareilly
Gurgaon
Bulandshahr
DELHI
Budaun
Shahjahanpur
Lakhimpur
Kheri
Sitapur
Aligarh
Koil
Hathras
Etah Farukhabad
Mutra
Bhurtpore
Agra
Mainpuri
Hardoi
Dholpur
Kerowli
Morar
GWALIOR
Jalaun
Hamirpur
Datia
Jhansi
Oraiha
Mow
Charkhari
Banda
Lalitpur
Tehri
Panna
Nagode
Goona
Sironj
Saugor
Rewah
Agori Khas
Palamow
Lohardugga
Jumla
Dhoulagiri
Naipalganj
Bahraich
Uska
Rapti R.
Gonda
Oudh
Basti
Gorakhpur
Motiharee
Champarun
Tirhoot
Mozufferpore
Sarun
Chupra
Azamgarh
Gogra R.
Ballia
Dinapore
Shahabad
Gya
Soane R.
Jaunpur
Ghazipur
Ganges R.
Mirzapur
Chunar
Benares
ALLAHABAD
Partabgarh
Fatehpur
Rae Bareli
Sultanpur
Fyzabad
Gumti R.
Bara Bank
LUCKNOW
Unao
Cawnpore
Etawah
Ganges R.
Jumna R.
Ken R.
Tons R.
Rer R.
Karnali R.
Sarda R.
Gandak R.
Tirsuli Gandak
Kosi R.
Betwa R.
Dhusan R.
Sirhind
Patiala
Umballa
Saharanpur
Karnal
Mozaffarnagar
Meerut
Moradabad
Bareilly
Shahjahanpur
Hardoi
Lucknow
Cawnpore
Jalaun
Gwalior
Jhansi
Banda
Rewah
Mirzapur
Benares
Gya
Gorakhpur
Oudh
Basti
Gonda
Bahraich
Sultanpur
Azamgarh
Ghazipur
Jaunpur
Dinapore
Shahabad
Gya
Lohardugga
PUNJAB
NEPAL
BENGAL
CENTRAL INDIA AGENCY
RAJPUTANA AGENCY
BAGHELKHAND
BUNDELKHAND
ROHILKHAND
TERAI
GARHWAL
KUMAUN
NEW PROVINCES
OUDH
Ganges R.
Jumna R.
Ken R.
Tons R.
Rer R.
Karnali R.
Sarda R.
Gandak R.
Gogra R.
Kosi R.
Dhusan R.
Betwa R.

# APPENDIX D.


N.-W. PROVINCES
AND
OUDH.
SCALE—1 inch = 80 miles or 1/5 068 800
100 50 0 100
Juar-fodder.
Map illustrating the extent of Juar-fodder cultivation in the districts of the North-Western Provinces and Oudh.
Explanation.
Districts in which the percentage of area under Juar-fodder to total cultivated area is :—
Under 0·5 per cent. ... ...
0·5 per cent. or over ; but under 1 ...
1 ditto ditto 2 ...
2 ditto ditto 5 ...
5 ditto ditto 10 ...
78°
82°
32°
28°
24°
Simla
Sirhind
Umballa
Patiala
Chakrata
Landour
Tiri
Dehra Dun
Saharanpur
Hardwar
Roorkee
Karnal
Muzaffarnagar
Bijnor
Ranikhet
Almora
Naini Tal
Katgodam
Meerut
Moradabad
Rampur
DELHI
Gurgaon
Bulandshahr
Chandausi
Pilibhit
Bareilly
Budaun
Lakhimpur
Kheri
Shahjahanpur
Aligarh
Koil
Hathras
Mutra
Etah Farukhabad
Mainpuri
Hardoi
Sitapur
Bhurtpore
Agra
Dholpur
Kerowli
Morar
GWALIOR
Jalaun
Etawah
Cawnpore
Unao
LUCKNOW
Bara Banki
Gumti R.
Fyzabad
Rae Bareli
Sultanpur
Fatehpur
Hamirpur
Partabgarh
Datia
Jhansi
Oraiha
Mow
Charkhari
Banda
Jumna R.
Ken R.
Betwa R.
Lalitpur
Tehri
Goona
Sirony
Saugor
Panna
Nagode
Sohawal
Rewah
Agor Khas
Ker R.
Tons R.
Chunar
Mirzapur
Benares
ALLAHABAD
Jaunpur
Ghazipur
Ganges R.
Ballia
Azamgarh
Gogra R.
Sarun
Chupra
Dinapore
Shahabad
Soane R.
Gya
Palamow
Lohardugga
Jumla
Dhoulagiri
Naipalganj
Bahraich
Uska
Rapti R.
Gonda
Oudh
Basti
Gorakhpur
Gandak R.
Tirsali Gandak
Motiharee
Champarun
Tirhoot
Mozufferpore
Karnali R.
Jamna R.
Ganges R.
Gandak R.
PUNJAB
NEPAL
BENGAL
RAJPUTANA AGENCY
CENTRAL INDIA AGENCY
BUNDELKHAND
BAGHELKHAND
OUDH
ROHILKHAND
TERAI
GARHWAL
NAINI TAL
MAUN
ROHILKHAND
BAGHELKHAND

# N.-W. PROVINCES AND OUDH.

SCALE—1 inch = 80 miles or $\frac{1}{5\,068\,800}$

100 50 0 100

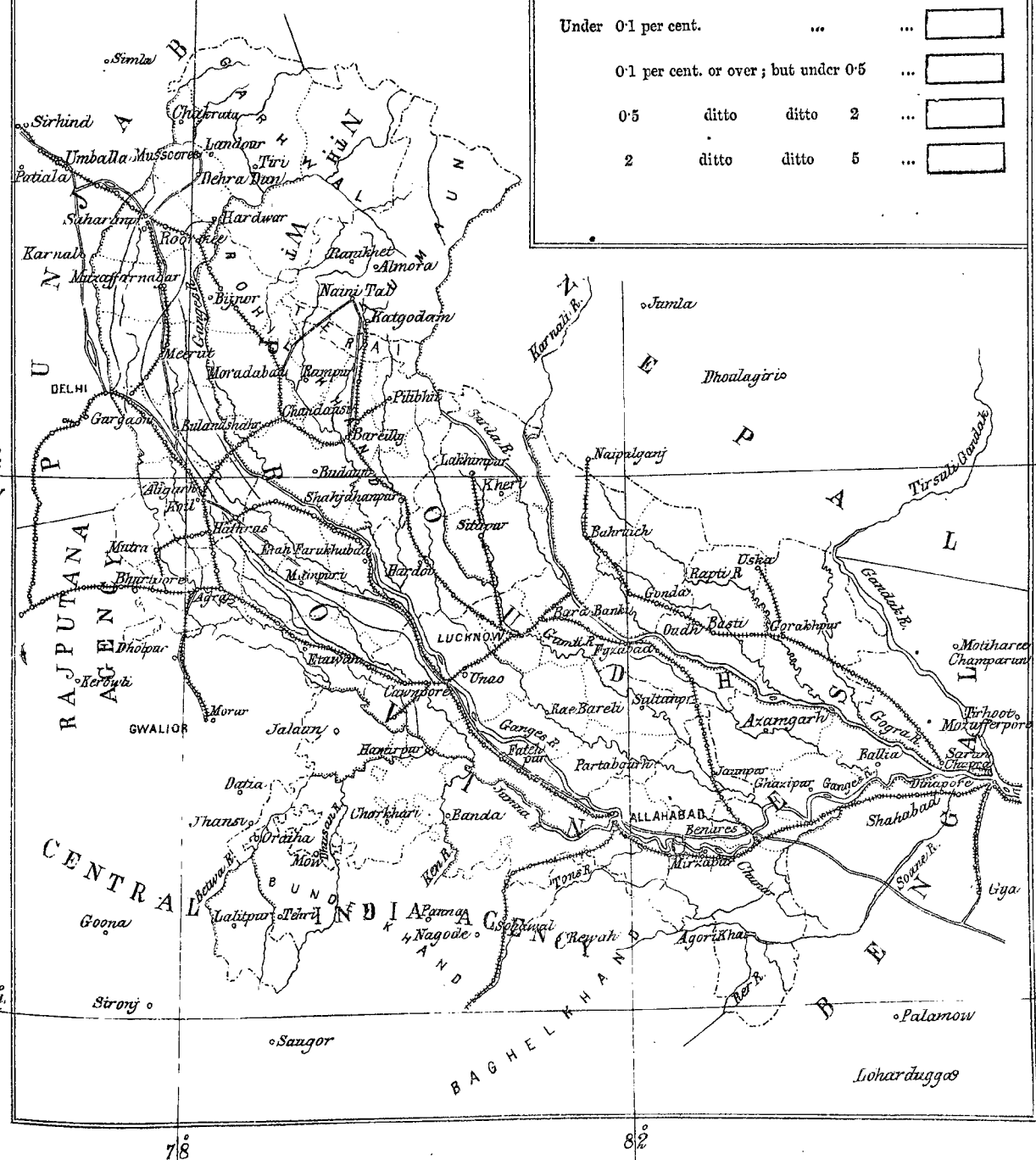
## Guar-Khûrthi.

Map illustrating the extent of Guar-Khùrthi cultivation in the districts of the North-Western Provinces and Oudh.

*Explanation.*

Districts in which the percentage of area under Guar-Khùrthi to total cultivated area is :—

| | | | | |
|---|---|---|---|---|
| Under 0·1 per cent. | ... | ... | | |
| 0·1 per cent. or over; but under 0·5 | | | | ... |
| 0·5 | ditto | ditto | 2 | ... |
| 2 | ditto | ditto | 5 | ... |



# APPENDIX E.

*List of zamindárs who submit forecast returns.*

| District. | Tahsíl. | Name of reporter. |
|---|---|---|
| Dehra Dún ... | Easter Dún ... | Babu Lal Singh. |
| | Ditto ... | Lala Pertab Singh. |
| | Ditto ... | Babu Muthra Pershad. |
| | Ditto ... | Babu Khushi Ram. |
| | Ditto ... | Babu Nain Singh. |
| | Western Dún ... | Chaudhri Dhian Singh. |
| Saháranpur ... | Saháranpur ... | Chaudhri Shib Sahai. |
| | Deoband ... | Muhammad Naim Khan. |
| | Rurki ... | Munshi Harsukh Rae. |
| | Nikur ... | Lala Chhajju Mal, |
| | Ambahta ... | Lala Gokal Chand. |
| | Saharanpur ... | Chaudhri Wazir Muhammad Khan. |
| Muzaffarnagar ... | Muzaffarnagar ... | Chaudhri Ganga Ram. |
| | Ditto ... | Chaudhri Ghasi Ram. |
| | Ditto ... | Messrs. Sher Singh and Badan Singh. |
| | Ditto ... | Babu Dewan Singh. |
| | Shamli ... | Lala Sarup Lal. |
| | Ditto ... | Imam Ali Khan. |
| | Ditto ... | Sayyid Muhammad. |
| | Ditto ... | Lala Kapur Chand. |
| | Jansath ... | Sayyid Asghar Ali Khan. |
| | Budhana ... | Chaudhri Darab Singh. |
| | Ditto ... | Muhammad Rahmat Ilahi Khan. |
| | Ditto ... | Lala Har Gulal Singh. |
| | Ditto ... | Muhammad Ismail. |
| | Ditto ... | Chaudhri Jwala Singh. |
| | Muzaffarnagar ... | Lala Pem Raj Sahúkar. |
| | Jansath ... | Chaudhri Hira Singh. |
| Meerut ... | Meerut ... | Chaudhri Daulat Singh. |
| | Gháziabad ... | Babu Koer Jai Narain Singh. |
| | Bághpat ... | Lala Jawahir Singh. |
| | Hapur ... | Chaudhri Debi Singh Rai Bahadur. |
| | Mawana ... | Koer Budh Singh. |
| | Hapur ... | Babu Dharam Singh. |
| Bulandshahr ... | Bulandshahr ... | Maulvi Muhammad Bakhsh. |
| | Sikandrabad ... | Munshi Damodar Sarup. |
| | Anúpshahr ... | Nawab Muhammad Ali Khan. |
| | Khurja ... | Muhammad Faiyaz Ali Khan. |
| | Khurja ... | Koer Muhammad Abdul Ali Khan. |
| | Anúpshahr ... | Koer Tara Singh. |
| | Bulandshahr ... | Maulvi Muhammad Mehbub Khan. |
| | Anúpshahr ... | Koer Muhammad Masud Ali Khan. |
| Aligarh ... | Aligarh ... | Rao Muhammad Imdad Husain Khan. |
| | Hathras ... | Nawab Muhammad Yusaf Ali Khan. |
| | Atrauli ... | Muhammad Raham Ali Khan, |
| | Sikandara Rao ... | Lala Basdeo Sahai. |
| | Kher ... | Thakur Gobind Singh. |
| Muttra ... | Chata ... | Lala Ramchandra. |
| | Mat ... | Lala Janki Pershad. |
| | Sadabad ... | Lala Khushal Kishore. |
| | Sadabad ... | Lala Sita Ram. |
| | Muttra ... | Lala Ram Kishun. |
| Agra ... | Ferozabad ... | Munshi Har Sahai. |
| | Fatehabad ... | His Highness the Mahárája of Bhadawar. |
| | Ferozabad ... | Thakurine Mahtab Koer. |
| | Khairgarh ... | Thakur Tika Ram. |
| | Fatehabad ... | Chaudhri Sundar Singh. |
| | Itmadpur ... | Sah Mohan Lal. |
| | Agra ... | Maulvi Ali Ahmad Khan. |
| | Ferozabad ... | Koer Karan Singh. |
| | Fatehpur-Sikri ... | Risaldar Major Pandit Raja Ram. |
| Farukhabad ... | Farukhabad ... | Lala Mangli Parshad. |
| | Kaimganj ... | Pandit Chokhe Lal. |
| | Chibramau ... | Munshi Morad Khan. |
| | Kanauj ... | Muhammad Zahur Ali. |
| Mainpuri ... | Mustafabad ... | Thakur Umrao Singh. |
| | Ditto ... | Muhammad Abdul Rahman Khan. |
| | Shikohabad ... | Thakur Laiq Singh. |
| | Karhal ... | Lala Phaldari Lal. |
| | Shikohabad ... | Lala Sri Narain. |
| | Mainpuri ... | Thakur Debi Singh. |

| District. | Tahsíl. | Name of reporter. |
|---|---|---|
| Fatehpur (*concluded*). ... | Gházipur ... | Babu Buddhi Singh. |
| | Ditto ... | Babu Dindayal Singh. |
| | Ditto ... | Muhammad Ali Bakhsh Khan. |
| | Khaga ... | Chaudhri Zahur Ahmad. |
| | Ditto ... | Babu Sripal Singh. |
| | Khakhreru ... | Shaikh Ahmad Bakhsh Khan. |
| | Ditto ... | Chaudhri Raghubar Dayal. |
| | Ditto ... | Babu Binda Parshad. |
| Bánda ... | Karwi ... | Babu Ganesh Dat. |
| | Pailani ... | Pandit Tulshi Ram. |
| | Ditto ... | Pandit Baldi Ram. |
| | Badausa ... | Lala Thakur Parshad. |
| | Girwan ... | Pandit Thakur Dín Pathak. |
| | Bánda ... | Pandit Chandi Din Dubey. |
| | Karwi ... | Sayyid Muhammad Baqar Husain. |
| Hamírpur ... | Hamírpur ... | Sayyid Muhammad Ismail. |
| | Mendha ... | Pandit Gopal Das. |
| | Kulpahar ... | B. Thakur Das. |
| | Mahoba ... | Pandit Gobind Rao. |
| | Muskara ... | Pandit Parag Dat. |
| | Rath ... | Koer Buldeo Singh. |
| Allahabad ... | Hundia ... | Sayyid Amir Husain Khan. |
| | Karchana ... | Thakur Mahabir Pershad, Narain Singh. |
| | Allahabad ... | Chaudhri Kamal-ud-din. |
| | Phulpur ... | Shaikh Inayat Husain. |
| | Mejah ... | Raja Ram Pertab Singh. |
| | Barah ... | Raja Banspat Singh. |
| | Sirathu ... | Lala Kashi Pershad. |
| Jaunpur ... | Mariahu ... | Muhammad Yahiya. |
| | Kuthan ... | Maulvi Sayyid Muhammad Kaim Ali. |
| | Machhlishahr ... | Maulvi Sayyid Muhammad Nuh. |
| | Kutahan ... | Sayyid Asghar Husain. |
| | Miriahu ... | Babu Sarabdawan Singh. |
| | Jaunpur ... | Raja Harihar Dat Dubey. |
| Azamgarh ... | Deogaon ... | Tahsíldár, Deogaon. |
| | Azamgarh ... | Ditto, Azamgarh. |
| | Mohul ... | Ditto, Mohul. |
| | Sagri ... | Ditto, Sagri. |
| | Muhamdabad ... | Ditto, Muhamdabad. |
| Mirzapur ... | Mirzapur ... | Pande Ram Sundar. |
| | Chunár ... | Pande Ram Badan. |
| | Mirzapur ... | Babu Balbhadra Singh. |
| Benares ... | Chandauli ... | Babu Gopi Nath Sinh. |
| Gházipur ... | Gházipur ... | Baba Sheo Nath Singh. |
| | Ditto ... | Qazi Nasir-ul Haq. |
| | Ditto ... | Babu Narain Das. |
| | Saidpur ... | Babu Sheo Pershad Ram. |
| | Korantadih ... | Babu Parmanand Rae. |
| Gorakhpur ... | Parauna ... | Rae Madan Gopal Rae. |
| | Ditto ... | Babu Ambika Pershad Narain Singh. |
| | Ditto ... | J. Macdonald. |
| | Deoria ... | Pandit Tapsi Pershad. |
| | Gorakhpur ... | Mirza Ibrahim Beg. |
| | Deoria ... | Munshi Bhirg Nath Sahai. |
| | Bansgaon ... | Maulvi Abdulghafur Khan. |
| | Ditto ... | Babu Mitrajit Singh. |
| Basti ... | Domariaganj ... | Babu Jai Dat Singh. |
| | Khalilabad ... | Lala Raj Kishor Lal. |
| Ballia ... | Bansdih ... | Babu Thakur Singh. |
| | Ballia ... | Pande Padumdeo Narain. |
| | Ditto ... | Babu Harcharan Singh. |
| | Ditto ... | Babu Bishun Pershad. |
| Jhánsi ... | Moth ... | Babu Govind Ram. |
| Jalaun ... | Orai ... | Pandit Bhawani Pershad Pathuk. |
| | Ditto ... | Babu Umrao Singh. |
| | Konch ... | Raja Dalip Singh. |
| | Madhogarh ... | Koer Pokhar Singh. |
| | Ditto ... | Babu Harnam Singh. |
| | Kálpi ... | Babu Budh Singh. |
| | Ditto ... | Babu Lachhman Pershad. |

| District. | Tahsíl. | Name of reporter. |
|---|---|---|
| Etáwah ... | Etawah ... | Lala Kali Charan. |
| | Ditto ... | Lala Madan Mohan Lal. |
| | Bhartana ... | Chaudhri Parsotam Singh. |
| | Bidhauna ... | Koer Nawab Singh. |
| | Ditto ... | Tiwari Kali Shankar. |
| | Phaphund ... | Misra Kidar Nath. |
| | Ditto ... | Dubay Dulare Lal. |
| | Auraiya ... | Rawat Jeet Singh. |
| | Ditto ... | Lala Sanwal Das. |
| | Phaphund ... | Haji Sayyid Muhammad Bashir Ali. |
| Etah ... | Aliganj ... | Chaudhri Gulab Singh. |
| | Jalesar ... | Raja Buldeo Singh. |
| | Kasganj ... | Chaudhri Muhammad Nurullah Khan. |
| | Etah ... | Rae Oudh Narain. |
| Bijnor ... | Bijnor ... | Koer Partab Singh. |
| | Ditto ... | Seth Jauhari Mal. |
| | Nagina ... | Mir Ale Ali. |
| | Ditto ... | Rae Kundan Singh. |
| | Dhampur ... | Chaudhri Basant Singh. |
| | Chandpur ... | Chaudhri Ram Dial Singh. |
| | Bijnor ... | Sri Ram and Kali Rae Das. |
| | Najibabad ... | Lala Dál Chand. |
| | Nagina ... | Shaikh Muhammad Abbas Ali. |
| | Dhampur ... | Chaudhri Dharam Singh. |
| | Ditto ... | Ditto Anup Singh. |
| | Bijnor ... | Koer Har Bans Singh. |
| | Chandpur ... | Raja Shiam Singh. |
| Moradabad ... | Moradabad ... | Mirza Asfandiar Beg. |
| | Bilari ... | Rae Ganga Sahai. |
| | Ditto ... | Chaudhri Kalian Singh. |
| | Sambhal ... | Chaudhri Muhammad Mahmud Khan. |
| | Ditto ... | Muhammad Hami-ud-din. |
| | Ditto ... | Chaudhri Muhammad Bahadur Khan. |
| | Thakurdwara ... | Ahmad Husain Khan. |
| | Ditto ... | Thakur Ishri Singh. |
| | Ditto ... | Chaudhri Girdhari Singh. |
| | Bilari ... | Sayyid Muhammad Ali Khan. |
| | Amroha ... | Sayyid Muhammad Mohsin Khan. |
| | Ditto ... | Chaudhri Dhian Singh. |
| | Ditto ... | Sayyid Bashirulla. |
| | Hasanpur ... | Maulvi Ahmad Husain. |
| | Ditto ... | Qazi Sayyid Muhammad Imdad Ali. |
| | Thakurdwara ... | Sahu Ram Rattan. |
| | Hasanpur ... | Chaudhri Zahur Husain. |
| Budaun ... | Sahswan ... | Shaikh Muhammad Mumtaz-uddin. |
| | Budaun ... | Maulvi Muhammad Iltifat Husain |
| | Ditto ... | Chandhri Muhammad Said-ud-din Husain. |
| Bareilly ... | Bareilly ... | Lala Lalita Parshad. |
| | Faridpur ... | Thakur Shib Singh. |
| | Ditto ... | Thakur Bilas Singh. |
| | Nawabganj ... | Pandit Sheo Parshad. |
| | Baheri ... | Chaudhri Hira Singh. |
| | Ditto ... | Muhammad Nabi Baksh. |
| | Mirganj ... | Thakur Buldeo Singh. |
| | Baheri ... | Muhammad Wazir Khan. |
| | Bareilly ... | Babu Damodar Das. |
| | Aonla ... | Thakur Baldeo Singh. |
| Sháhjahánpur ... | Pawayan ... | Pandit Ajudhia Parshad. |
| | Jalalabad ... | Thakur Narayan Singh. |
| | Ditto ... | Maulvi Imam Ali Khan. |
| | Tilhar ... | Sayyid Muhammad Zakir Ali. |
| | Pawayan ... | Dewan Sardar Singh. |
| Pilibhít ... | Pilibhít ... | Naik Dalip Singh. |
| Cawnpore ... | Sheorajpur ... | Pandit Gopal Parshad Awasti. |
| | Bilhaur ... | Babu Durga Parshad. |
| | Bilhaur ... | Pandit Sidh Gopal Misra. |
| | Bhognipur ... | Maulvi Ghulam Husain Khan. |
| | Akbarpur ... | B. Surjan Singh. |
| | Derapur ... | Koer Sher Singh. |
| | Cawnpore ... | Rai Bahadur Lala Dargahi Lal. |
| Fatehpur ... | Fatehpur ... | Lala Kishun Sahai. |
| | Ditto ... | Lala Thakur Parshad. |
| | Kalianpur ... | Babu Man Singh. |
| | Ditto ... | Muhammad Ali Khan. |

| District. | Tahsíl. | Name of reporter. |
|---|---|---|
| Lalitpur ... | Lalitpur ... | Koer Buldeo Singh. |
| | Ditto ... | Dewan Bijai Bahadur Mazbut Singh. |
| | Ditto ... | Pandit Rae Anand Ram. |
| | Ditto ... | Koer Bhupat Singh |
| | Mahrauni ... | Rao Pahar Singh. |
| | Ditto ... | Koer Raja Jooi Deo. |
| | Ditto ... | Koer Bakht Singh. |
| | Lalitpur ... | Koer Mangal Singh. |
| | Mahrauni ... | Dewan Parichat. |
| | Ditto ... | Dewan Bhau Partab Singh. |
| | Lalitpur ... | Koer Nirbhai Singh. |
| Tarai ... ... | Káshipur ... ... | Raja Hari Raj Singh. |
| | Rudarpur ... ... | Abdul Karim Khan. |
| Lucknow ... ... | Malihabad ... ... | Muhammad Ahmad Khan. |
| | Lucknow ... ... | Qazi Muhammad Wasi Ali Khan. |
| Unao ... ... | Safipur ... ... | Chaudhri Narain Singh. |
| | Purwa ... ... | Thakur Buldeo Bux. |
| | Mohan ... ... | Maulvi Muhammad Wasi-ul-zaman. |
| Bara Banki ... | Jahangirabad ... | Maulvi Tasadduq Rasul Khan. |
| | Ramsanehighat ... | Chaudhri Abdul Rahman and Fazal Rahman. |
| | Fatehpur ... | Sheikh Muhammad Kazim Husein Khan. |
| | Fatehpur ... ... | Bakhshi Her Pershad. |
| | Haidergarh ... ... | Chaudhri Muhammad Mustafa Husein. |
| | Fatehpur ... ... | Darab Ali Khan. |
| | Ditto ... ... | Babu Ganga Bakhsh Singh. |
| | Ramsanehighat ... | Rai Narain Bali. |
| Hardoi ... | Bilgram ... | Rani of Katiyari. |
| | Shahabad ... | Thakur Ganga Bux. |
| | Sandila ... | Maulvi Fazal Husain. |
| | Ditto ... | Raja Randhir Singh. |
| | Ditto ... | Thakur Sanwal Singh. |
| | Bilgram ... | Sayyid Wasi Haider. |
| | Shahabad ... | Muhammad Saeed-ud-din. |
| | Ditto ... | Babu Har Diyal. |
| | Ditto ... | Babu Sarup Narain. |
| | Hardoi ... | Thakur Sumer Singh. |
| | Ditto ... | Lala Amar Nath. |
| | Ditto ... | Lala Jwala Parshad. |
| | Ditto ... | Babu Jot Singh. |
| | Sandila ... | Babu Wazir Chand. |
| Kheri ... | Lakhimpur ... | Mr. J. Moreton. |
| | Mohamdi ... | L. D. Hearsey. |
| | Ditto ... | Raja Kishun Dat Singh. |
| | Ditto ... | Thakur Balbhadr Singh. |
| | Ditto ... | Munsarim of Raja Amir Hasan Khan. |
| | Ditto ... | Thakur Gopal Singh. |
| | Nighasan ... | Mir Hafiz Ali. |
| Fyzabad ... | Bikapur ... | Babu Mahindar Dat Singh. |
| | Ditto ... | Raja Azam Ali Khan. |
| | Tanda ... | Babu Mewa Ram. |
| Bahraich ... | Nanpara ... | Raja Jang Bahadur Khan. |
| | Kaiserganj ... | Sheikh Nawazish Ali. |
| | Bahraich ... | Raja Hira Singh. |
| Gonda ... | Utraula ... | The Agent, Balrampur Estate. |
| | Gonda ... | Bhaiya Tirbhawan Dat Ram. |
| | Ditto ... | Thakur Raghubir Singh. |
| | Ditto ... | Bh. Jagdambika Pertab Bahadur Singh. |
| | Ditto ... | Bhaiya Shambhu Dat Ram. |
| Rae Bareli ... ... | Hasunpur ... | Thakur Raghubar Bux Singh. |
| | Digbijaiganj ... | Raja Jagmohan Singh Bahadur. |
| | Ditto ... | Chaudhri Sharaf-ud-din Husain. |
| | Salon ... | Mr. G. P. Garthan. |
| | Rae Bareli ... | Raja Rampal Singh. |
| | Digbijaiganj ... | Lala Gur Sahai. |
| Sultánpur ... ... | Hasunpur ... | Raja Muhammad Ali Khan. |
| | Amethi ... | Raja of Amethi. |
| | Dera ... | Raja of Dera. |
| | Sultánpur ... ... | Babu Bansi Dhar. |
| | Musafirkhana ... | Maulvi Fazal Husain. |
| | Ditto ... ... | Babu Fateh Bahadur Singh. |
| | Ditto ... ... | Babu Sripal Singh. |
| | Kadipur ... ... | Babu Ganesh Parshad. |
| | Musafirkhana ... | Babu Beni Madho Singh. |

| District. | Tahsíl. | Name of reporter. |
|---|---|---|
| Partábgarh ... ... | Patti ... ... | Rae Madho Parshad Singh. |
| | Ditto ... ... | Dewan Ranbijai Bahadur Singh. |
| | Kunda ... ... | Rae Sarabjit Singh. |
| | Ditto ... ... | Sheikh Ahmad Husain Khan Bahadur. |

# ORDERS OF GOVERNMENT.

No. $\frac{1143}{\text{I—218}}$ OF 1891.

FROM

THE CHIEF SECRETARY TO GOVERNMENT,
N.-W. PROVINCES AND OUDH,

TO

THE DIRECTOR OF LAND RECORDS AND AGRICULTURE,
N.-W. PROVINCES AND OUDH.

DATED NAINI TAL, THE 26TH MAY 1891.

SIR,

REVENUE DEPT.

I AM directed to acknowledge the receipt, on 11th April last, of your Annual Report on the Administration of the Department of Land Records and Agriculture for the year ending 30th September 1890.

2. Of the several branches of work entrusted to the control and supervision of the Department of Land Records and Agriculture, that relating to the maintenance of village records is the most important, and is dealt with in detail in the Revenue Administration Report of the Provinces. But you rightly remark that your report would be incomplete without some mention in it of this branch of the work of your Department, and many improvements were introduced during the year, which will, it is hoped, secure both increased accuracy of record and economy of labour. In the eastern districts, where the records have been notoriously inaccurate, the pay of the patwáris, hitherto very inadequate, has been raised. This, coupled with an increase in the staff of kánúngos, and the special measures taken in Azamgarh, should make it possible to bring the standard of the eastern districts up to that prevailing in other parts of the Provinces. Your best attention must continue to be directed to the proper maintenance of the records in the permanently settled districts, of which the village papers have been re-cast at a great expenditure of money and labour.

3. At your request the attention of District Officers was called last year to their duties with reference to the pargana book. The instructions were not issued in time to effect material improvement in the year under report, but I am to ask that in the report for the current year you will detail the districts in which the orders of Government have been neglected in regard to the systematic use and maintenance of that record.

4. The embankments raised for the reclamation of waste land in Jhánsi were inspected last December by Major Corbett, Superintending Engineer. The embankments were in good order and the tanks with one exception were full of water, but no new works will be undertaken until further experience of their usefulness in the improvement of adjoining cultivation. The works have under recent orders been transferred to the Irrigation Branch of the Public Works Department.

5. The attempt to convert usar tracts under experiment by the Irrigation Department into fuel and fodder reserves has not proved successful, as the grass grown is of little value and the trees do not reach maturity, but die as soon as their roots reach the substratum of kankar. The attention of that Department will be called to the statement on pages 20—22 of your report, and inquiry will be made whether it is proposed to continue these experiments. Of the four plots which are under observation and experimental treatment by your Department, it is satisfactory to note that the system of manuring and deep ploughing in the Amramau and Cherat plots is more hopeful, and that fields reclaimed by this method have been let at remunerative rates. With regard to the Juhi plot, which has been enclosed for the last eight years in the hope that if left undisturbed a natural growth would spring up, it must be admitted that so far the experiment has been a failure from a commercial point of view. The Lieutenant-Governor, however, approves your proposal to continue the experiment for scientific purposes, in order that observations may be made as to the changes in the soil and produce which may be effected by enclosure.

6. The expenditure on arboriculture has increased by Rs. 4,324 in the year under review, while the income has fallen from Rs. 47,084 to Rs. 46,834. In ten districts only did the income cover the expenditure, as compared with thirteen in the previous year. As suggested by you, the attention of District Officers will be directed to the figures in Appendix B of your report, which show how much more is realized from arboriculture in some districts than in others immediately adjoining.

7. The experiments at the Cawnpore Farm were continued, but it is intended to reduce their number and to devote more attention to producing selected seed for distribution. The Lieutenant-Governor notices with satisfaction the work which the farm is doing.

8. The Saháranpur and Lucknow Gardens are now very nearly self-supporting, and excellent results have been obtained in them. The date palm plantations in Saháranpur are said to have suffered from the attacks of a species of grub hitherto unknown in this part of India, but identified with one that has caused much damage in Singapur, and it is suggested that it may have been imported from the Persian Gulf with the trees now in the garden. A grub has also attacked the palm in the Lucknow plantation, and inquiry should be made whether it is of the same species as that which has done so much harm at Saháranpur, and whether in either garden the grub has attacked any other than palm trees.

9. Appendix E of your report contains a list of zamindárs who have rendered you great assistance in the preparation of your forecasts of the several crop returns, and I am to request that you will convey to these gentlemen the thanks of the Lieutenant-Governor for their very useful services.

10. In paragraph 37 of the report you make suggestions as to matters that should receive greater attention at the annual district agricultural shows, and recommend that more time should be devoted to practical agricultural business. District Officers will be asked to consider your remarks.

11. A noticeable feature in the returns of traffic registered was the marked decrease in the exports of wheat and oilseeds to the chief seaport towns. On the other hand there was an increase in the exports of grain to the Panjáb, Bengal and Bombay. The difficulty that was experienced in April last year in obtaining in the provincial markets the 36,000 maunds of gram and barley required to meet the scarcity in Kumaun and Garhwál, is evidence that the stocks of food grains had been much diminished by the shortness of the harvest. The inferior harvests of last year have been followed by a rabí of which the outturn was on the whole somewhat below the average: at the same time the rise in the price of wheat in the London markets and a falling exchange have encouraged the export trade; these combined circumstances have had a serious result in raising the prices of grain to their present abnormal height, and the already depleted stocks have become still further exhausted. Should any thing occur to injure the next harvest, there will be cause for serious apprehension. The Lieutenant-Governor would be glad to learn any conclusion to which your inquiries may lead you as to the effect of the recent exports on the food stock of these Provinces and on prices: a matter to which he wishes that your attention should continue to be closely directed.

12. With reference to the scheme of emigration from the congested districts of these Provinces to the Central Provinces, you remark that it has failed owing to the zamindárs who had applied for villages being unable to accept the terms offered by the Chief Commissioner. But since your report was written the Chief Commissioner has, at the instance of the Government of India, modified the condition prohibiting the employment of local labour, and one of the applicants has accepted the lease of six villages in the Charwa tract.

13. The Lieutenant-Governor charges me to convey to you his acknowledgments of the services you have rendered in every branch of your duties, and especially of the prompt and very effective help you gave last summer in the purchase and transport of the food-supplies for the famine-stricken tracts in Kumaun.

I have the honor to be,

SIR,

Your most obedient servant,

J. WOODBURN,

*Chief Secy. to Govt., N.-W. P. and Oudh.*

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# REPORT ON THE OPERATIONS

OF THE

# DEPT. OF LAND RECORDS AND AGRICULTURE,

## NORTH-WESTERN PROVINCES AND OUDH,

## For the year ending 30th September, 1891.

---

No. $\frac{81}{T.}$ OF 1892.

FROM

T. W. HOLDERNESS, ESQ., C.S.,

DIRECTOR OF LAND RECORDS AND AGRICULTURE,

NORTH-WESTERN PROVINCES AND OUDH,

To

THE CHIEF SECRETARY TO GOVERNMENT,

NORTH-WESTERN PROVINCES AND OUDH.

*Dated Cawnpore, the 2nd March* 1892.

SIR,

I HAVE the honor to submit the annual report on the work of this department for the year 1890-91. Its submission has been unavoidably delayed. On my return from leave in December, I found numerous matters requiring immediate attention and was obliged to postpone the preparation of this report.

### SECTION I.

MAINTENANCE OF VILLAGE RECORDS.

2. This section of the report is, in accordance with the orders of Government, submitted separately to the Board of Revenue for incorporation into its revenue administration report. As I mentioned in my last year's report, the maintenance of the village records and the superintendence of the kanúngo and patwári establishments engross most of the Director's time and leave him little opportunity for agricultural work. This is becoming even more the case now than formerly, as the inspection of several districts a year preliminary to settlement occupies the whole of the camping season and involves close and laborious enquiries. The agricultural duties of the department necessarily devolve in a great measure on the Assistant Director, but his time also is considerably taken up with record and patwári work. This subordination of agriculture to revenue and statistical work is in accordance with the policy hitherto laid down by the Government of India for the guidance of Agricultural Departments, though to judge by the comments that occasionally appear in the public press, the policy is not without opponents. I shall be glad if Dr. Voelcker's misson leads to a strengthening of the agricultural side of the department, without sacrificing its connection with the land record system, which I deem essential to its permanence and full utility.

### SECTION II.

ANALYSIS OF DISTRICTS.

3. I have nothing to add to the observations I made in 1889-90 and 1890-91, regarding the maintenance of the pargana book, and its value to district administration. I am happy to report that the orders issued by the Government on the subject have

not been without result, as I observe that in many districts the volumes now show signs of more frequent use. The Government of India has recently expressed its opinion that the pargana book in its present form is not in all respects sufficient as a guide to the district officer; the question of its improvement will have my careful attention.

## SECTION III.

### System of Collection of Revenue and Rental in precarious tracts.

*Nil.*

## SECTION IV.

### Measures of Protection, including Arboriculture.

4. **Reclamation of usar land.**—The experiments under the control of this department, which were described in last year's report, are still in progress. The four plots are (1) the Juhi and Amramau plots in the Cawnpore district; and (2) the Gursikran and Cherat plots in the Aligarh district. The experiments under the management of the Irrigation Department have been abandoned, as no adequate results were obtained.

5. The Juhi plot may be first noticed. This plot measures 102 acres and is situate on an usar plain about two miles from Cawnpore. It was acquired in 1882 at the cost of one rupee an acre, and has now been under observation for nine years. The total expenditure up to date, including cost of acquisition and fencing, has been Rs. 2,266. The expenditure in the year under report was limited to Rs. 187. The receipts up to date amount to only Rs. 50. There are now 982 trees on the plot, of which 80 are date-palms and 400 babul. The trees, however, are stunted, and it is evident that in most localities their roots have struck into the underlying kankar bed. During the rains the plot is covered with luxuriant herbage, but the grasses prove on examination to be mainly indifferent rain grasses, which wither up as soon as the rains are over and will not make into nutritious hay. The fact is now conclusively established that the typical usar grasses cannot be counted on for nutritions fodder and are coincident and conterminous with the rains. They are altogether different from the well-known grasses of Bundelkhand and Rájputána, which keep green throughout the cold weather and make good hay. It is probable that, as the quality of the soil improves through enclosure, the character of the grasses on usar land will gradually improve, and the observations made by Mr. Duthie confirm this supposition. But the process, even when helped by artificial sowings, must necessarily be slow. In the last rains most of the grass on the Juhi usar was made into hay as an experiment. It has not yet been sold, as the cavalry at Cawnpore have refused it for their horses. But it will, no doubt, find purchasers among cattle-owners, though at a price which leaves little profit after the expenses of cutting and stacking are deducted. The rest of the grass was sold standing at the end of the rains at Re. 1-4-0 the bigha, and was cut and consumed in a green state. It is always possible either to sell the grass thus or to allow cattle to graze it down, but the hay experiment was useful in its way. In the reclamation of usar the great thing is the exclusion of cattle during the rains, as, if admitted during that season, they tread the clayey soil into unmanageable stiffness. When the rains are over moderate grazing, for the month or two the grass lasts, does no harm. If a zamíndár would give his usar lands this very limited amount of protection, our experience at Juhi shows that the soil and the grasses it supports will gradually improve. I have discussed the future of Juhi with Mr. Duthie, and we consider that on a portion of it systematic experiments should be made in the sowing of grasses, a subject about which very little is known in India, and the rest treated in the simple fashion which any zamíndár might adopt.

6. The Amramau plot, consisting of 52 acres, adjoins Juhi and was also taken up nine years ago. It was originally treated in the same way as Juhi, but in 1885 the experiment of manuring and deep ploughing was commenced. The total expenditure and receipts are shown in the margin. There has been no increase in the reclaimed area during the year under report as the rains were exceedingly unfavourable. Of the 39 acres previously reclaimed 19 were let to tenants for Rs. 150 ; 11 were cultivated under departmental supervision, and five left fallow owing to late rains. An offer of Rs. 2,000 for the land with its buildings has been received, but if the question of sufficient canal-irrigation can be satisfactorily settled, more than this may be expected. I have therefore delayed sale of the land and propose, if the next rains are favourable, to bring the uncultivated portion under the plough.

| | Rs. | Rs. |
|---|---|---|
| Total expenditure up to 30th September 1891 | | ... 9,411 |
| Cash receipts from sale of milk, cattle, grain, and from rent ... ... ... | 4,885 | |
| Recoverable outstandings ... ... | 350 | |
| Value of live stock transferred to Cherat usar, | 938 | |
| Value of live stock, grain and implements ... | 1,008 | ... 7,181 |
| Difference ... ... | | 2,230 |

7. The Cherat usar, measuring 242 acres, is five miles from Aligarh. Half the plot is maintained as a fuel and fodder reserve, and the other half has been set apart for the experiment of reclamation, which has proved successful at Amramau. About 50 acres have already been reclaimed and yield fair crops. It is proposed to break up more land as soon as the reclaimed fields, hitherto under direct management, are let to tenants. The herd of cattle kept at Amramau was removed towards the end of the year to Cherat and 52 cows were bought and added to the same. A dairy was established in August under the management of Mr. E. Keventer, the dairy expert, whose services have been engaged for one year with the sanction of the Government of India. Butter and cheeses have been successfully made since September last, and the demand for them is increasing. It is too early yet to feel quite assured as to the financial success of the dairy, but there is every hope that with careful management it will pay its way. Mr. Keventer's services are lent to persons seeking advice in the management of dairies, and instruction is also given on the Cherat farm, where a cream separator and other machines are working daily. He is also engaged in carrying on experiments to determine the effect of various feeding stuffs on the quality and quantity of milk. The portion of the Cherat usar under grass has slightly improved as compared with the previous year. Some success has been obtained in putting down the inferior usar grass by sowing seeds of better varieties obtained from the Director of the Botanical Department, but so far the feeding properties of the grass on the reserve are poor.

The total receipts and expenditure of Cherat are given below :—

| | Total expenditure. | Total receipts. |
|---|---|---|
| | Rs. a. p. | Rs. a. p. |
| Usar reclamation, including cost of acquiring the land, fencing, &c. ... | 4,534 10 7 | 450 13 1 |
| Dairy ... ... ... ... ... | 6,636 13 5 | 1,236 15 9 |
| Cultivation ... ... ... ... ... | 582 9 6 | 191 2 0 |
| Total .. | 11,754 1 6 | 1,878 14 10 |

The reclaimed arable land will be let in 1892 to cultivators of neighbouring villages who are keen to engage at Rs. 4 and Rs. 5 the bigha. A large masonry well has been made, as the supply of canal water is precarious ; the farm buildings are commodious and substantial : and the stock of cattle and implements is large. If the value of all these items and the increased market value of the land are taken into account, the Government has lost nothing by the experiment.

8. The Gursikran usar plot is about seven miles from Aligarh, and comprises 960 acres. The greater part of it is kept as a fuel and fodder reserve. But a

small portion has been brought under the plough by tenants who have been settled on the estate and have been allowed land rent-free. The new fields are very difficult to work. The yield of rice crops taken on them has not been bad, but the rabi crops have hitherto completely failed owing to the presence apparently in the soil of certain fungoid germs particularly injurious to wheat and barley. Experiments have been started at the Cawnpore farm with the infected seed in order to see whether it would not be possible to check the attack of the fungus by steeping the seed before sowing in solution of certain fungicide chemical agents. It is proposed to assess rent on the reclaimed fields next year.

The usar grass grows very luxuriantly. There is little demand for it, however, in its green state, and it makes very inferior hay. The coarser grasses find a sale for thatching purposes. It is proposed to utilize the better grasses in the ensuing year for feeding the large herd of cows kept at the Cherat dairy. The total expenditure up to the end of the year amounted to Rs. 5,937-13-8 and the total receipts to Rs. 2,533-3-2. I may note that unsuccessful attempts were made last month (November 1891) to sell some of the grass to the troops assembled at Aligarh during the autumn manœuvres. The grass was condemned as unsuitable for horses. But it was thought good enough to steal, as the reserve was invaded by grass-cutters and many thousand maunds were carried off despite the resistance of the overseer. Mr. Duthie has complained of the injury done by these marauders, and I am in correspondence with the authorities in the hope of obtaining some compensation.

9. **Arboriculture.**—The total length of avenues at the close of 1889-90 was 4,899 miles, to which were added 258 miles during the year under review; making a total of 5,157 miles. The largest additions were made in the districts of Muzaffarnagar, Jhánsi, Jaunpur and Bara Banki.

The number of miles under avenues, and of the trees planted in each division during 1890-91 was as under :—

| Divisions. | Length of avenues under operation during 1890-91. | Total length of avenues at the close of 1889-90. | Length of avenues planted during 1890-91. | Total length of avenues at the close of 1890-91. | Total number of trees planted during 1890-91. |
|---|---|---|---|---|---|
| | Miles. | Miles. | Miles. | Miles. | Miles. |
| Meerut ... ... | 474 | | 57 | | 18,437 |
| Agra ... ... | 309 | | 19 | | 12,445 |
| Rohilkhand... ... | 461 | | 31 | | 10,725 |
| Allahabad ... ... | 812 | | 70 | | 17,233 |
| Benares ... ... | 310 | 4,899 | 45 | 5,157 | 11,084 |
| Gorakhpur ... ... | 146 | | 6 | | 2,726 |
| Kumaun ... ... | 31 | | ... | | 1,382 |
| Lucknow ... ... | 381 | | 2 | | 1,818 |
| Fyzabad ... ... | 335 | | 28 | | 6,497 |
| Total ... | 3,259 | 4,899 | 258 | 5,157 | 82,347 |

The details of columns 3 and 5 cannot be given owing to the recent reorganization of the divisional limits.

The number of miles planted in the previous years and under operation in 1890-91 was 3,001, showing an increase of 36 miles as compared with 1889-90. There is, however, a decrease of 58 miles in the number of miles planted with trees in 1890-91 against 1889-90. The total number of miles under operation during the year under report was 3,259, against 3,281 in the preceding year, showing a decrease of 22 miles.

The operations in the districts named below were mainly confined to the maintenance of the avenues planted in the previous years :—

Dehra Dún, Meerut, Muttra, Mainpuri, Etah, Mirzapur, Ballia, Gorakhpur, Azamgarh, Unao, Sitapur, Kheri, Fyzabad, Gonda and Partábgarh.

The number of trees planted in 1890-91 was 82,347 against 87,072 in 1889-90, showing a decrease of 4,725.

A sum of Rs. 42,117 was spent in the year under review on the avenues planted in the previous years, and Rs. 16,010 on those planted in 1890-91, making a total of Rs. 58,127 against Rs. 57,137 in the year before.

Zamíndárs and other private individuals planted trees and maintained avenues on public roads at their own expense in the following districts, and amongst them the Managers of the Balrámpur and Kapurthala estates in the districts of Gonda and Bahraich, respectively, deserve prominent mention :—

Saháranpur, Etáwah, Bijnor, Fatehpur, Cawnpore, Allahabad, Jaunpur, Ballia, Benares, Gorakhpur, Gonda and Bahraich.

The utilization of private enterprise in this direction is very favourably reported on in all these districts except Gorakhpur.

10. The number of groves in 1890-91 was 84 against 75 in 1889-90, showing an increase of 9 groves. There was also in 1890-91 an increase of 7 acres in the area under groves as compared with 1889-90, the area for the two years being 523 and 516 acres respectively.

Rs. 2,412 were disbursed on groves during the year under report against Rs. 2,373 in the previous year, showing an excess of Rs. 39 only.

11. The number of nurseries maintained during 1890-91 was 195 against 197 in 1889-90.

The number of trees left in the nurseries at the close of 1889-90 was 301,052 to which were added 129,780 during the year under report, making a total of 430,832 trees of which 160,768 were taken out and planted during the year, leaving a balance of 270,064 at the close of the year.

The sum of Rs. 9,591 was spent on nurseries during 1890-91 as compared with Rs. 10,295 in 1889-90 showing a decrease of Rs. 704.

12. The receipts and charges in each district for six years is given in Appendix B. The divisional figures for the year under review are shown in the following statement :—

| Divisions. | Receipts. | | | Charges. | | | |
|---|---|---|---|---|---|---|---|
| | Loppings and fellings. | Fruits, grass, &c. | Total. | Avenues. | Groves and nurseries. | Loppings and fellings. | Total. |
| | Rs. | Rs. | Rs. | Rs. | Rs. | Rs. | Rs. |
| Meerut ... ... | 20,321 | 1,039 | 21,360 | 11,798 | 2,052 | 212 | 14,062 |
| Agra ... ... | 2,879 | 1,873 | 4,752 | 7,933 | 1,751 | 161 | 9,845 |
| Rohilkhand ... | 1,468 | 5,139 | 6,607 | 7,715 | 684 | 182 | 8,581 |
| Allahabad... ... | 6,324 | 2,487 | 8,811 | 15,982 | 2,534 | 236 | 18,752 |
| Benares ... ... | 1,816 | 3,554 | 5,370 | 4,833 | 907 | 188 | 5,928 |
| Gorakhpur ... | 617 | 936 | 1,553 | 2,137 | 694 | 49 | 2,880 |
| Kumaun ... ... | 2 | 120 | 122 | 240 | 857 | ... | 1,097 |
| Lucknow ... ... | 1,098 | 779 | 1,877 | 3,263 | 1,976 | 197 | 5,436 |
| Fyzabad ... ... | 1,570 | 1,541 | 3,111 | 4,226 | 548 | 23 | 4,797 |
| Total ... | 36,095 | 17,468 | 53,563 | 58,127 | 12,003 | 1,248 | 71,378 |

The receipts for the year under report amounted to Rs. 53,563 against a Budget Estimate of Rs. 50,000 and against Rs. 46,834, actual receipts of the preceding year, showing an increase of Rs. 3,563 and Rs. 6,729 respectively. The details of Rs. 53,563 are given below :—

| | Rs. |
|---|---|
| From loppings and fellings ... ... ... ... ... | 36,095 |
| „ sale of fruits and grass ... ... ... ... ... | 17,468 |

The receipts of the following districts exceed the expenditure incurred in them, which is very creditable to the authorities concerned : Muzaffarnagar, Meerut, Mainpuri, Bijnor, Moradabad, Pilibhít, Cawnpore, Allahabad, Benares and Fyzabad.

The charges during the year under report amounted to Rs. 71,378 against Rs. 71,313 in the preceding year. The details of the charges are as follows :—

| | Rs. |
|---|---|
| 1. Avenues ... ... ... ... ... ... | 58,127 |
| 2. Groves ... ... ... ... ... ... | 2,412 |
| 3. Nurseries ... ... ... ... ... ... | 9,591 |
| 4. Loppings and fellings ... ... ... ... ... | 1,248 |

The charges exceed the receipts of the year by Rs. 17,815.

## SECTION V.

### Agriculture, including Experimental Farms.

13. **Cawnpore Experimental Farm.**—The seasons of the year under review were not so favorable as those of 1889-90. The rains were quite abnormal during both the kharíf and the rabi seasons, and the water-supply from the canal was irregular and intermittent, owing to the remoddeling of distributaries in the neighbourhood of Cawnpore.

14. There were very heavy showers of rain in the beginning of the kharíf season and then a protracted break in August and September. The rabi season of 1891, on the contrary, looked very hopeful at first, but just as the ears were forming rain fell abundantly, accompanied by high winds which beat down the advanced plants. This was followed by a severe frost which seriously damaged the rabi. The area of the Farm and the number of permanent experiments are the same as in the last year, but the temporary experiments of the kharíf and rabi seasons number 10 and 12, respectively, against 10 and 13 of the last year. The term of one of the rabi experiments having expired, it was discontinued. The chief objects of the permanent experiments are to ascertain the relative utility of different manures, the effect of a judicious rotation of crops, and the effect of continuous cropping of unmanured land. These experiments are made on a carefully measured series of plots, the manner of working each plot is precisely fixed, and the yield accurately recorded. Maize in kharíf and wheat in rabi are the main staples with which the permanent experiments are conducted. A full record of the result is given in the annual report of the farm. The temporary experiments are made with numerous staples, and have for their object the comparison of one variety of seed with another, the comparison of different methods of ploughing, and the ascertainment of the yield of different crops cultivated in the ordinary native fashion. Of these experiments the deep-ploughing series and the green-soiling series are perhaps the most instructive. The farm claims to have shown that the simple and inexpensive expedient of sowing and ploughing in a crop of hemp or indigo greatly improves the yield of poor and otherwise unmanured soils ; also that the yield of such soils is increased by thorough ploughing with an improved plough. In addition to these experiments, the farm is utilised to grow selected seed for distribution to zamíndárs and cultivators.

15. The sugarcane experiments have confirmed the result noticed in the last year's report as to the advantage of taking a second crop from the roots of the last year's crop. These experiments have further shown that the native way of planting cane is more productive in this country than that practised in the West Indies.

16. As stated in the last year's report, the rabi season experiments are chiefly confined to wheat, but a small area is also given up to potatoes, barley, peas and gram. The wheat crop covered about 17 acres of land, and the total outturn was 273 maunds 4½ seers. Thus there was an average yield of 16 maunds or 1,300lbs. to the acre against 17 maunds in the last year. A plot of the green-soiling series yielded 2,904lbs., which is much larger than the maximum yield (2,856lbs.) of any plot in 1890. Several

varieties of Canadian wheats and oats which were received from the Agricultural Department of Canada were experimentally tried. The yield of grain was poor, but as a green fodder crop the oats, owing to the luxuriance of the straw, promise to be useful.

Of the different kinds of Indian wheats tried on the farm, the Sindhi wheat gave, on the whole, the best results. But this result was exceptional, as, taking one year with another, Muzaffarnagar wheat undoubtedly holds the first place.

17. Cultivators residing in the neighbourhood of the farm have been encouraged to use the departmental ploughs and pumps, and have in some instances been taught to make gur with the improved boiling pan.

PRIVATE FARMS.

18. **Babu Lachman Parshad's farm at Cawnpore.**—Babu Lachman Parshád my Personal, maintains an Experimental Farm at his own cost and under his own management. The land lies at a short distance from the Government Farm. He has introduced the simplest workable experiments which the country cultivators can very easily understand and copy. There are five principal experiments, a brief account of which is given below.

(1) *Rotation experiments.*—These are conducted in a field divided into 16 equal plots of $\frac{1}{10}$ of an acre each. The soil is loamy. The object of the experiment is to determine the manurial effect of the root resiaue of certain crops upon the succeeding crop of wheat grown without direct application of any manure whatever. It has shown that when indigo precedes the wheat the yield of the latter is about 10 maunds the acre, which is very satisfactory for double-cropped land of a poor quality.

(2) *Farmyard manure* versus *ashes.*—This covers 12 plots of the same area. It has been found that their ashes are not so good fertilizers for wheat as manures containing nitrogenous organic matter.

(3) *The quantitative experiment with farmyard manure.*—This experiment was tried on four plots, with the result that increase in the farmyard manure increases the outturn proportionately.

(4) *Value of gypsum for legumnious crops.*—This experiment is carried on in 36 plots of 100 square yards each, half of which are manured with different quantities of gypsum, varying from 8 to 12 maunds per acre, and the other half left unmanured. The result of this experiment shows that, although gypsum increases the outturn of indigo, yet the cost of gypsum cannot be covered by the increased produce, unless it could be obtained at a very cheap rate in the plains, say, 8 annas a maund.

(5) *Mixed crops* —This is carried on in 12 plots measuring $\frac{1}{4}$ of an acre each. Cotton and juár were sown separately in two plots, and a mixture of these two in the rest of the fields. The object of the experiment is to determine the utility of sowing mixed crops, as also to ascertain the extent to which the outturn of the principal crop is diminished. The plot in which juár was sown with arhar and til gave the best financial result.

19. *Demonstration Farm, Meerut.*—This Farm is in the hands of Chaudhri Debi Singh, one of the prominent members of the Agricultural Association, and is under the direct management of Muzaffar Khán, an apprentice of the Cawnpore Farm, towards whose pay the Department contributes Rs. 25 per mensem.

The results of the kharíf and rabi experiments were very satisfactory on the whole: 2,500 maunds of soft white Muzaffarnagar wheat were distributed among cultivators in the neighbourhood. Experiments with Canadian wheat have proved (1) that its cultivation is rather more expensive than that of the indigenous variety; and (2) that a cold climate is likely to be more suitable to this variety of wheat.

Experiments with Canadian barley proved that "the Polar six rowed" variety stands first in outturn. Its ears were 8 inches long, and the flour was almost as good as that of wheat. It consequently fetched a higher price.

20. *Lyall Farm, Ujhauli.*—The Assistant Director, who has visited this farm speaks highly of it. The owner, Chaudhri Said-ud-din Husain, has a well deserved reputation for the interest he takes in agricultural matters.

Cotton experiments were very successfully carried on in this farm. Two plots were selected for these experiments; in one the cotton seed was sown along ridges, and in the other broadcast. After the third picking, each plot was interplanted with indigo. The crop sown along the ridges yielded a larger outturn. The interplantation of indigo is a new feature, and is recommended for trial elsewhere by Chaudhri Said-ud-din, who manages the farm.

21. *Jatao Farm* extends over 70 acres of land and is owned by Kuar Karan Singh. Various experiments were made, of which those with *sargo* proved a failure, as the plants were materially injured by insects long before they were ready for pressing.

22. *The Jamnapar Agricultural Association.*—No report of experiments made by the members of this Association has been received during the year.

23. **Saharanpur Botanical Gardens.**—The rains were exceptionally heavy and ill-distributed, and the Gardens suffered in common with agriculture throughout the province from the excessive rainfall of July and the abnormal cessation of the rains in September. The winter was cold but otherwise not unfavorable.

24. The total cash receipts amounted to Rs. 16,323 against Rs. 18,729 in the preceding year, and the expenditure to Rs. 20,144 against Rs. 20,404 in 1889-90. If to the cash receipts be added Rs. 2,800, the cost of seeds and plants distributed to soldiers' gardens, the total receipts amount to Rs. 19,124 against an expenditure of Rs. 20,143-14-10. This excludes the value of seeds and plants gratuitously supplied to public gardens and societies, and the indirect saving to Government on drugs grown and manufactured for the Medical Department. If all these be taken into account the Gardens, despite an unfavorable year, were more than self-supporting. All circumstances considered, the financial results of the Gardens are creditable to Mr. Gollan's manangement.

25. The interesting experiment of cultivating sugarcane from seed is being undertaken by the Superintendent. It may possibly have to extend over a series of years before new or improved varieties appear. But its importance is recognised alike by the scientific world and all persons practically interested in the sugar industry. The inquiry has brought to light the highly instructive fact that the flowering habit of the cane is well known to native agriculturists, but that superstition leads them to jealously destroy what the man of science labours to preserve and turn to far-reaching uses.

26. Numerous fruit trees, vegetables, and useful plants of exotic origin are under observation and culture in the Gardens and additions are constantly being made. The beneficial effect of the Gardens on horticulture in Upper India is capable of easy verification by any one who moves about the country and notes the progress which gardening and fruit growing are making among the native community.

27. **Lucknow Horticulture Gardens.**—The financial results and the general management of the Gardens are highly satisfactory. The total cash receipts amounted to Rs. 13,646, including interest on investments, rent of certain lands, subscriptions and the nazúl contributions. This excludes Rs. 408, the value of the seeds and plants distributed gratis. The total expenditure amounted to Rs. 15,000, against Rs. 14,500 in the preceding year.

28. The season was good and the mango crop unusually heavy: nearly all the varieties of the excellent fruit in the Garden yielded well.

Planting out and stocking the Garden with fruit trees progressed steadily throughout the year. The Gardens are in good order and improving in appearance and value. The distribution of fruit trees to the public increased during the year and the demand for acclimatized vegetable and flower seeds was also good.

The value of the leaves of the eucalyptus tree for cleaning engine boilers has been further proved by numerous experiments during the year, and the Gardens have been largely indented on for seeds by the various railway authorities.

29. **Motesar Garden, Kumaun.**—Before the end of the year under report the late Superintendent, Mr. McMaster, died suddenly and the services of Mr. Siers, a highly trained English gardener, have been secured.

The new store shed has been completed and the bungalow and outbulidings enlarged and repaired.

Hoeing and terracing of land under fruit trees were carried on and cultivation of seed potatoes extended. The seed potatoes found a ready sale. But the income from this source is likely to diminish, as the potato cultivation has widely extended in the hills, and the market is now fully supplied with good seed, a result which is greatly due to the Motesar Nursery.

The total receipts amounted to Rs. 1,522-14-3 against Rs. 1,026-15-6 in the preceding year, and the total expenditure to Rs. 4,495-11-9 against Rs. 2,630-5-10 in 1889-90.

30. **Khusru Garden, Allahabad.**—The principal feature of the Gardens during the year has been the construction of the Allahabad Water-Works. By the construction of the water-works the Garden has sustained a loss of Rs. 1,500 per annum on account of ground taken up for the purpose. But the loss will be compensated when the Garden is supplied with water free of charge.

The number of plants added to the Garden was insignificant.

The total receipts amounted to Rs. 2,048-8-9 against Rs. 2,076-9-6 in the preceding year. The total expenditure amounted to Rs. 4,996-13-3 against Rs. 3,963-3-3 in 1889-90.

31. **Taj Gardens.**—The Home Government having intimated the appointment of Mr. A. B. Westland to be Superintendent of the Taj Gardens, it is hoped that the condition of the Gardens will decidedly improve.

The question of irrigating the Taj Gardens by steam power and of refixing electric lighting apparatus is still under the consideration of the local authorities.

32. **Date Palm Plantations.**—There is nothing of interest to record regarding the Arabian date palm plantations in the Saháranpur and Lucknow Gardens. In both places the climate appears too damp in years of normal rainfall to allow the fruit to ripen, and many of the trees succumb. They would do much better in the drier climate of Bundelkhand, and the attention of the Collectors of those districts might be profitably directed to the subject. Plants for experiment can be obtained from Saháranpur.

33. **Forecasts of special crops.**—Forecasts of cotton, wheat, oilseeds and indigo were regularly submitted during the year. As in previous years, the areas dealt in them were taken from crop returns filed by patwáris, while the "condition" and "outturn" were based on bulletins received from the members of the Agricultural Association, and other zamíndárs who enrolled themselves as agricultural correspondents of the Department. The aid rendered by the correspondents in this direction has been most cordial.

Under this head mention may be made of an inquiry into the food production and consumption of these provinces, which I undertook at the direction of the Local Government in June last, when the large exports of wheat to Europe in the face of high prices, short supplies, and a possible failure of the rains, gave rise to apprehension. The results of the inquiry were published in the form of a note and attracted some attention at the time.

## SECTION VI.

### Introduction of Agricultural Implements.

34. **Agricultural Shows.**—Agricultural shows were held in many districts of the United Provinces and one in the Native State of Rámpur. Most of these were attended by the Assistant Director, who delivered lectures on agriculture and explained to the public at large the uses of improved implements. The number of samples of agricultural produce and of cattle shown at these shows was considerably above that of the previous year. These exhibitions are becoming more and more popular every year and furnish the Department with good opportunities of acquainting the agricultural classes with improved agricultural implements and certain useful processes.

35. **Distribution and sale of Implements.**—The following statement gives the distribution for the year under report compared with the previous year :—

| Name of implement. | In 1889-90. | | | | 1890-91. | | | | More. | Less. | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Sold. | Trial. | Hire. | Total. | Sold. | Trial. | Hire. | Total. | | | |
| Ploughs ... ... | 84 | 8 | 1 | 93 | 191 | 8 | 6 | 205 | 112 | ... | Three ploughs given gratis. |
| Chain pumps ... | 15 | 13 | 3 | 31 | 16 | 11 | 8 | 35 | 4 | ... | |
| Grain kibbling mills ... | 16 | ... | ... | 16 | 10 | ... | ... | 10 | ... | 6 | |
| Chaff cutters ... | 6 | ... | 1 | 7 | 2 | ... | ... | 2 | ... | 5 | |
| Flour mills ... | ... | ... | ... | ... | 2 | ... | ... | 2 | 2 | ... | |
| Sugar pan ... | 2 | ... | ... | 2 | 1 | ... | 1 | 2 | ... | ... | |
| Dredger (Bull's) ... | ... | 3 | ... | 3 | ... | 3 | 5 | 8 | 5 | ... | |
| Boring apparatus ... | ... | 9 | ... | 9 | ... | 6 | ... | 6 | ... | 3 | |
| American hoes ... | ... | ... | ... | ... | 1 | ... | ... | 1 | 1 | ... | These two machines were obtained during the year and were not in stock before. |
| Hay and straw press ... | ... | ... | ... | ... | 1 | 1 | ... | 2 | 2 | ... | |

It is gratifying to observe that the number of ploughs sold is more than double of what it was in the previous year. The increase is due to an increased demand for the small Whatt's plough made at the Department's workshop and sold for the petty sum of Rs. 2. It is cheap, durable and best suited to the means of the ordinary cultivator. The demand for the pump has not diminished, but the high price stands in the way of its increased sale. Some of the cultivators, while fully recognizing the advantages of using the pump for lifting canal water, are prevented through want of means from purchasing the pump and they consequently hire it from the Department. The latter is always ready to grant applications from such cultivators, the object being to adopt any reasonable course which would induce people to use this efficient machine and thus ultimately to create a demand for the same among the well-to-do landholders who through ignorance or otherwise have not hitherto come forward to buy and introduce the pump in their estates. An illustrated catalogue of the implements available on the farm is kept in office and supplied free of cost to applicants.

36. **Distribution of seeds.**—There has been considerable increase under wheat, oats, sorghum and Nankin cotton, as compared with the previous year. The decrease under barley and peas is due to diminished demand and under other heads to the fact that no seeds were available at the farm on account of delay in the arrival of fresh supply from England. The statement below gives the details.

| Name of seed. | Distributed in | | Difference. | | Remarks. |
|---|---|---|---|---|---|
| | 1889-90. | 1890-91. | More. | Less. | |
| | lbs. | lbs. | lbs. | lbs. | |
| Wheat, Muzaffarnagar, mundia, &c., | 14,075 | 25,871 | 11,796 | ... | |
| Barley ... ... ... | 225½ | ... | ... | 225½ | No demand during the year. |
| Oats ... ... ... | 2,648 | 10,121 | 7,473 | ... | |
| Peas ... ... ... | 20½ | ... | ... | 20½ | Ditto ditto. |
| Sorghum ... ... | 83½ | 379¼ | 295¾ | ... | |
| Nankin cotton ... ... | ... | 16½ | 16½ | ... | |
| Guinea grass ... ... | 2 | ½ | ... | 1½ | Great demand, but no seeds available in the farm. |
| Lucerne grass ... ... | 28¼ | 29¼ | 1 | ... | |
| Turnip ... ... ... | 14½ | 1 | ... | 13½ | Seeds not received from England. |
| Mangold ... ... | 18 | ... | ... | 18 | |

37. **Agricultural Association.**—A General Meeting of the Association was held at Cawnpore on the 20th and 21st of March 1891. It was attended by 17 members and 14 zamíndár visitors. Among the proposals for the improvement of agriculture and the breed of cattle which were discussed, it may be noted that the members agreed to purchase improved implements and good seed, and to sell them to their cultivators on favorable conditions. As a result of this proposal 67 implements have since been sold to the members. A few of them sent indents for wheat seed, but mostly such purchases were directly made at the seed-stores of the neighbouring fellow members.

38. **Agricultural Journal.**—The circulation of the journal somewhat decreased during the year, but it is hoped that the falling off is accidental. In its present form, the journal consists of 20 pages, of which the first 4 contain editorial matter, and the next 4 are devoted to the translation of the farm and other experimental reports. Extracts from the English journals take up the following 4 pages and the remaining 8 are intended for miscellaneous notes and correspondence; so that it has sufficient readable matter for those who have a taste for agriculture. The department charges a nominal subscription of annas 8 from the residents of the United Provinces and Re. 1 from the outsiders, exclusive of postage.

To students of Primary Schools it is supplied on half price, provided that the Head-masters or the Deputy Inspectors of Schools concerned countersign their applications for the journal.

39. **Boring apparatus.**—Well-sinking operations were carried on at Aligarh, Bijnor and Bulandshahr during the year under report and 74 experimental borings for wells were made. The Department has the services of two well-sinkers on Rs. 10 and Rs. 15 a month each. The demand for well-sinkers shows a steady increase. The well-to-do landed proprietors who employ these men pay the freight of the boring tools as well as the pay of the well-sinkers for the working days.

## SECTION VII.

### Registration of Traffic.

40. The following traffic was registered during the year 1890-91:—

(1) Traffic with Tibet and Nepal.

(2) Traffic in conection with the Dún Railway projects.

(3) Traffic by rail with the Ports, Native States and other British provinces.

41. **Traffic with Tibet and Nepal.**—There was no change during the year either in the establishment or position of posts maintained for registration of this traffic. All except the hill posts were inspected by an Inspector attached to the Department, and their registration work was found fairly good.

42. The total traffic with Tibet and Nepal during the year amounted to 27,38,090 maunds, valued at Rs. 99,86,579 against 23,22,056 maunds valued at Rs. 96,04,761 in 1889-1890. The following table shows the imports and exports of the two countries separately during the year under report and the preceding year :—

| Direction of traffic. | 1890-91. | | 1889-90. | |
|---|---|---|---|---|
| | Weight. | Value. | Weight. | Value. |
| | Mds. | Rs. | Mds. | Rs. |
| *Imports*— | | | | |
| From Tibet ... ... ... ... | 50,162 | 4,79,135 | 67,186 | 6,89,072 |
| From Nepal ... ... ... ... | 24,14,028 | 59,22,255 | 19,42,248 | 50,14,196 |
| Total ... | 24,64,190 | 64,01,390 | 20,09,434 | 57,03,268 |
| *Exports*— | | | | |
| To Tibet ... ... ... ... | 39,953 | 1,90,244 | 54,774 | 2,76,863 |
| To Nepal ... ... ... ... | 2,33,947 | 33,94,945 | 2,57,848 | 36,24,630 |
| Total ... | 2,73,900 | 35,85,189 | 3,12,622 | 39,01,493 |

The imports from Nepal show an increase of 4,71,780 maunds in weight and Rs. 9,08,059 in value. It is principally due to an improvement in the timber trade, which in the preceding year had dwindled down to 3,11,678 maunds.

In the case of Tibet, both the imports and exports show a decrease in the year under report. The decrease is principally due to less import of borax and salt from Tibet. The import of borax in the present year is the smallest on record since 1877-78. The decrease appears to be due to the unusually large import in 1888-89, which over-stocked the market. The decrease in the export to Tibet occurred principally under grain, which the Bhotias receive in exchange for their salt.

43. **Traffic in connection with the Dun Railway projects.**—For registration of traffic in connection with the Dún Railway projects five posts were started in February 1890 and were kept up for the complete period of 12 months :—

one at Dara Rit on the Saháranpur-Chakráta road ;

two on the road *viâ* Mohand, namely at Asarori between Saháranpur and Dehra and at Jakhan between Dehra and Rájpur ;

one at Kharkheri, immediately above Hardwár on the road leading to Dehra *viâ* the Eastern Dún ;

and one at Sahaspur on the road going from Dehra to Rámpur Mandi.

Trained muharrirs were employed and every post was suspected three times by an Inspector attached to the Department.

44. An examination of the figures collected shows that the bulk of the traffic between the districts of the Dún and the plains proceeds *viâ* the Mohand pass. The traffic by the Eastern Dún route as ascertained at Kharkheri is comparatively insignificant and a considerable portion of it leaves the Dehra road a short distance above Hardwár for Deopryag and Badrinath in Garhwál. This is particularly the case with the passenger traffic, more than three-fourths of which takes the pilgrim route to Garhwál. The imports to the Dún consist principally of cotton goods, metals, oil and tobacco from Saháranpur ; grain and salt from Saháranpur and the adjoining districts of the Panjáb ; and sugar from Saháranpur and Bijnor. The exports from the Dún are chiefly made up of malt liquors from the Mussoorie breweries, tea, timber and lime.

| *Imports to the Dún.* | | *Mds.* |
|---|---|---|
| Chakráta road— | | |
| Total imports ... | ... | **1,43,028** |
| Imports of cotton goods | ... | 1,485 |
| ,, Grain | ... | 83,245 |
| ,, Metals | ... | 2,731 |
| ,, Oils | ... | 1,743 |
| ,, Salt | ... | 12,938 |
| ,, Sugar | ... | 9,025 |
| ,, Tobacco | ... | 727 |
| Mohand road— | | |
| Total imports ... | ... | **6,57,177** |
| Import of cotton goods | ... | 4,295 |
| ,, Grain | ... | 4,50,226 |
| ,, Metals | ... | 15,947 |
| ,, Oils | ... | 15,447 |
| ,, Salt | ... | 26,213 |
| ,, Sugar | ... | 40,152 |
| ,, Tobacco | ... | 5,773 |
| Hardwár road— | | |
| Total imports ... | ... | **36,953** |
| Import of cotton goods | ... | 1,420 |
| ,, Grain | ... | 7,106 |
| ,, Metals | ... | 319 |
| ,, Oils | ... | 359 |
| ,, Salt | ... | 2,087 |
| ,, Sugar | ... | 12,539 |
| ,, Tobacco | ... | 975 |

| *Exports from the Dún.* | | *Mds.* |
|---|---|---|
| Chakráta road— | | |
| Total exports ... | ... | **1,24,619** |
| Export of tea ... | ... | 2,396 |
| ,, timber ... | ... | 27,892 |
| ,, lime ... | ... | 27,126 |
| Mohand road— | | |
| Total exports ... | ... | **7,02,057** |
| Export of tea ... | ... | 9,601 |
| ,, timber ... | ... | 3,63,907 |
| ,, lime ... | ... | 2,14,467 |
| ,, liquors ... | ... | 62,468 |
| Hardwár road— | | |
| Total exports ... | ... | **1,18,023** |
| Export of tea ... | ... | 4 |
| ,, timber ... | ... | 23,768 |
| ,, lime ... | ... | 44,282 |
| ,, liquors ... | ... | 70 |

45. The traffic of the Saháranpur-Dehra road *viâ* the Mohand Pass had previously been registered in 1881-82. The traffic as registered this year shows considerable increase over the traffic registered in 1881-82. The increase is chiefly accounted for by larger imports of grain, due possibly to the scarcity prevailing in 1890 in the hills; and to larger exports of timber and lime from the Dún.

| | 1881-82. *Mds.* | 1890-91. *Mds.* | Increase in 1890-91. *Mds.* |
|---|---|---|---|
| Total traffic *viâ* Mohand | ... **8,36,997** | ... **13,59,234** | ... **5,22,237** |
| Imports of grain to the Dún | ... 2,57,642 | ... 4,50,226 | ... 1,92,584 |
| Exports of timber from the Dún | ... 1,37,974 | ... 3,63,907 | ... 2,25,933 |
| Exports of lime from the Dún | ... 1,20,932 | ... 2,14,467 | ... 93,535 |

46. **Rail-borne traffic.**—Registration of rail-borne traffic continued on the system described in previous reports. Returns were received every quarter from railway offices two months after the quarter to which they pertained and published by the Department for the use of merchants and others interested in them. There was no change in the number of blocks. The stations noted on the margin were opened during the year in these provinces, the first two were included in the Meerut and the rest in the Allahabad block.

Raisi.
Masit.
Dhaura.
Dingwali.
Attara.
Chitra Kote.

47. The following table shows the traffic which these provinces transacted with the neighbouring provinces, ports and native states during the year ending 31st March 1891 and the preceding year.

| | Exports. | | | | Imports. | | | |
|---|---|---|---|---|---|---|---|---|
| | 1889-90. | | 1890-91. | | 1889-90. | | 1890-91. | |
| | Mds. | Rs. | Mds. | Rs. | Mds. | Rs. | Mds. | Rs. |
| *British Provinces excluding chief seaport towns.* | | | | | | | | |
| Madras ... ... ... ... ... ... | 9,150 | 1,58,076 | 16,035 | 3,08,028 | 991 | 19,716 | 1,107 | 26,361 |
| Bombay ... ... ... ... ... ... | 8,24,566 | 41,85,493 | 7,62,044 | 48,38,585 | 3,61,463 | 23,86,463 | 3,92,991 | 32,31,528 |
| Sindh ... ... ... ... ... ... | 1,45,827 | 7,31,969 | 2,14,092 | 11,30,423 | 858 | 9,754 | 821 | 9,020 |
| Bengal ... ... ... ... ... ... | 24,14,885 | 1,16,27,239 | 24,21,672 | 1,28,86,646 | 74,44,628 | 1,18,69,682 | 80,79,193 | 1,45,51,784 |
| Panjáb ... ... ... ... ... ... | 53,05,589 | 2,35,34,894 | 51,16,151 | 2,54,32,432 | 21,41,223 | 1,61,60,686 | 65,79,786 | 2,69,17,136 |
| Central Provinces ... ... ... ... ... | 4,72,304 | 35,42,534 | 7,21,389 | 45,83,586 | 3,37,203 | 22,91,057 | 5,59,112 | 27,98,462 |
| Berar ... ... ... ... ... ... | 1,60,051 | 10,56,329 | 1,43,297 | 12,64,977 | 57,193 | 10,52,538 | 34,994 | 5,97,440 |
| Total ... | 93,32,372 | 4,48,36,534 | 93,94,680 | 5,04,49,677 | 1,03,43,559 | 3,37,89,896 | 1,56,48,004 | 4,81,31,731 |
| *Native States.* | | | | | | | | |
| Rájputána and Central India ... ... ... ... | 34,64,345 | 1,64,31,058 | 35,23,568 | 1,78,95,984 | 37,05,683 | 1,37,71,138 | 54,13,385 | 1,72,77,223 |
| Nizam's Territory ... ... ... ... ... | 4,464 | 79,862 | 5,064 | 1,13,498 | 244 | 1,540 | 354 | 4,024 |
| Mysore ... ... ... ... ... ... | 4,238 | 70,601 | 5,717 | 1,13,237 | 112 | 659 | 39 | 560 |
| Total ... | 34,73,047 | 1,65,81,521 | 35,34,349 | 1,81,22,719 | 37,06,039 | 1,37,73,337 | 54,13,778 | 1,72,81,807 |
| *Chief seaport towns.* | | | | | | | | |
| Madras ... ... ... ... ... ... | 60,400 | 10,55,895 | 37,540 | 7,04,865 | 892 | 26,006 | 833 | 20,532 |
| Bombay ... ... ... ... ... ... | 36,28,480 | 2,87,35,174 | 17,35,157 | 1,65,35,079 | 4,50,168 | 1,11,13,431 | 6,83,088 | 1,24,32,055 |
| Karachi ... ... ... ... ... ... | 13,617 | 1,00,888 | 14,870 | 79,270 | 46,757 | 2,80,611 | 1,28,943 | 6,22,589 |
| Calcutta ... ... ... ... ... ... | 72,00,393 | 7,36,96,752 | 56,27,637 | 6,40,17,898 | 24,29,664 | 5,41,54,865 | 29,22,324 | 5,37,82,561 |
| Total ... | 1,09,02,890 | 10,35,88,709 | 74,15,204 | 8,13,37,112 | 29,27,481 | 6,55,74,913 | 37,35,188 | 6,68,57,737 |
| GRAND TOTAL ... | 2,37,08,309 | 16,50,06,764 | 2,03,44,233 | 14,99,09,508 | 1,69,77,079 | 11,31,38,146 | 2,47,96,970 | 13,22,71,275 |

48. It will be seen that while the exports in 1890-91 fell off by 34 lakhs maunds, the imports increased by considerably more than double that amount. The decrease in exports occurred principally in the export of cotton, wheat, linseed and rapeseed to the ports, of rice to the Panjáb and Rájputána and of gram and other grains, besides wheat and rice to Bengal and the Bombay Presidency; while increase in imports is almost wholly explained by larger import of grain from Bengal, Panjáb, Rájputána and the Central Provinces and the exclusion of railway plant from returns of the preceding year. The exports of sugar to the Panjáb, Rájputána, Central Provinces and the Bombay Presidency were considerably in excess of the exports in the preceding year.

| | *Weight.* Mds. | *Value.* Rs. |
|---|---|---|
| Total decrease in the export of 1890-91 compared with the export of 1889-90. | 33,64,076 | 1,50,97,256 |
| Decrease in the export of cotton to Calcutta and Bombay ... | 5,50,200 | 1,09,39,160 |
| Ditto wheat ... ... ... ... | 11,91,464 | 29,58 395 |
| Ditto linseed and rapeseed ... ... ... | 11,02,714 | 54,76,400 |
| Ditto rice to the Panjáb and Rájputána ... | 6,30,368 | 21,48,199 |
| Ditto gram and other grain, besides wheat and rice to Bengal and Bombay Presidency, including ports. | 13,54,526 | 24,73,457 |
| Minus increase in the export of sugar ... ... ... ... | 7,00,772 | 51,71,781 |
| Ditto weight of railway plant and rolling stock registered in 1890-91 but not registered in 1889-90. | 9,10,398 | 29,95,207 |
| Total increase in the import of 1890-91 compared with the import of 1889-90. | 78,19,891 | 1,91,33,129 |
| Increase in the import of grain from Bengal ... ... | 7,16,784 | 17,09,431 |
| Ditto Panjáb ... ... ... ... | 43,22,429 | 87,64,780 |
| Ditto Rájputána and Central Provinces ... | 14,84,470 | 31,79,357 |
| Weight of railway plant and rolling stock registered in 1890-91 and not registered in 1889-90. | 11,32,755 | 54,42,140 |

49. **Salt trade.**—The total salt trade of the province as registered during the year ending 31st March 1891 amounted to 39,09,340 maunds by rail and 86,856 maunds by road against 39,88,349 and 95,853 maunds respectively in the preceding year. The railway figures include the traffic transacted by rail with the ports, other British provinces and Native States. The road figures comprise traffic with Tibbet and Nepal only, as the imports from the Panjáb, Rájputána and Central India by road and from Bengal by road and river were not registered either in 1890-91 or in 1889-90. The decrease in the traffic of 1890-91 compared with that of the previous year is principally due to smaller receipts by rail from the Panjáb. Traffic with other parts remained almost the same as in the preceding year :—

| *Import.* | 1889-90. *Maunds.* | 1890-91. *Maunds.* |
|---|---|---|
| *By rail—* | | |
| Import of Chesshire salt from Calcutta and Bengal. | 3,20,900 | 3,42,457 |
| Import of sea salt from Bombay Presidency. | 3,14,443 | 3,16,549 |
| Import of rock salt from the Panjáb. | 5,11,983 | 4,27,549 |
| Import of Sambhar salt from Rájputána and Central India. | 27,80,469 | 27,51,812 |
| *By road—* | | |
| Import of Bhotea salt from Tibbet. | 33,806 | 28,772 |

| *Export.* | 1889-90. *Maunds.* | 1890-91. *Maunds.* |
|---|---|---|
| *By rail—* | | |
| Export to places in Rájputána, adjoining these provinces, principally from Agra ... | 36,764 | 48,889 |
| Export to other places ... | 23,790 | 22,084 |
| *By road—* | | |
| Export to Nepal... ... | 62,047 | 58,084 |

## SECTION VIII.

### MISCELLANEOUS.

50. **The Lucknow Museum.**—During the year under report the total number of specimens received was 5,937, of which 434 were purchased, 3,552 (zoological exhibits) collected by the Museum employés, and 1,951 received as presents. This shows an increase of 3,985 against 1,952 in the previous year.

The total number of visitors was 170,055, the daily average of visitors being 465 as compared with 182,454 in the preceding year. The experiment of reserving one day in the month for the admission to the Museum of *parda-nashin* ladies has been continued with success; the attendance on these days having risen from 494 in 1889-90 to 645 in the year under report. The value of the articles of artware sold from the artware depôt, which in the previous year had fallen from Rs. 5,413 to Rs. 3,799,

diminished further during the year under report to Rs. 1,434. The Committee has therefore decided to close the depôt from next year. The total expenditure amounted to Rs. 13,379-3-2 against Rs. 14,972-3-1 in the preceding year. The receipts amounted to Rs. 1,921-3-6 against Rs. 2,053-12-9 in 1889-90.

The Museum Committee have undertaken the preparation of casts from architectural fragments collected by the local archæological department, and applications for sets have been received from other Museums in India and elsewhere.

51. **Locusts.**—The appearance of locusts in the months of October, November and December 1890 was reported from the districts of Unao, Fatehpur, Fyzabad, Kumaun and Sultánpur, and in the months of May, June and July 1891 from Ballia, Sultánpur, Lalitpur, Muzaffarnagar and Partábgarh. In the majority of cases no injury to crops was reported.

Copies of a further note on the Locusts of North-Western India, compiled by Mr. Cotes of the Indian Museum, were received through the Local Government and circulated to the district officers in the North-Western Provinces and Oudh, with a view to supply Mr. Cotes with specimens of locusts and information regarding them. This was done by many district officers.

52. **Emigration of cultivators to Central Provinces.**—In the last year's report it was reported that three or four zamíndárs had applied for villages in the Charwa jungles, but after further correspondence they found themselves unable to accept the terms finally offered by the Chief Commissioner and the matter dropped. On the representation of the Government of India, however, the Chief Commissioner reconsidered his terms and so far relaxed the prohibition against the employment of local agency by the zamíndárs of these provinces who applied for leases, as to permit them to hire local labourers at harvest times. Sayad Muhammad Mir accepted a lease for six villages in the Charwa tract. Two more applications were subsequently received for villages, but the applicants were informed that all the villages which the Chief Commissioner was prepared to allot to persons in these provinces had been taken up, and no land was available there.

53. **Specifications of inventions.**—Ten cases were received during the year from the Government of India and were duly reported on.

54. **General.**—I held the office of Director till the middle of August, when I went on leave, the Assistant Director officiating for me. The cold weather of 1890-91 was mainly occupied in examining the districts of Hardoi, Rae Bareli, Budaun and Sultánpur for settlement purposes. In March I was placed on a committee for the improvement of technical education in the provinces, and visited Madras, Bombay and Bengal. The report of the committee was submitted to the Government in June, and is still under consideration.

Mir Muhammad Husain, M. R. A. C., held the office of Assistant Director till August, when he acted as Director. His services have now been placed at the disposal of the Government of Hyderabad, with the object of organizing a Department of Agriculture in the Nizam's dominions. His experience and zealous activity will stand him in good stead in his present office, and I am very glad that his merits have been thus recognized. The post of Assistant Director is now filled by Sayyid Muhammad Hadi, a graduate of the Cirencester College.

Babu Lachman Parshád, B. A., my Personal Assistant, has given me the greatest assistance in the statistical and traffic sections of the office; and I am much indebted to him for his unflagging energy and painstaking ability.

I have the honor to be,

SIR,

Your most obedient servant,

T. W. HOLDERNESS,

*Director.*

## APPENDIX A.

*Memorandum showing the expenditure and receipts of the Department of Land Records and Agriculture, North-Western Provinces and Oudh, during the year* 1890-91.

| Heads of charges. | Budget allotment. | Actual expenditure. | Savings on budgeted expenditure. | Receipts paid into Treasury. |
|---|---|---|---|---|
| | Rs. a. p. | Rs. a. p. | Rs. p. p | Rs. a. p. |
| Office establishment ... | 24,468 0 0 | 24,154 8 8 | 313 7 4 | ... |
| Do. contingencies ... | 6,688 0 0 | 5,592 0 4 | 1,095 15 8 | ... |
| Do. travelling allowance ... | 2,500 0 0 | 1,258 15 0 | 1,241 1 0 | ... |
| Ghâzipur tobacco farm ... | 3,000 0 0 | 2,893 7 2 | 106 8 10 | 6,588 7 0 |
| Reh and glass experiments ... | ... | ... | ... | ... |
| Traffic registration ... | 12,000 0 0 | 11,166 0 0 | 834 0 0 | ... |
| Cawnpore experimental station contingencies. | 9,332 0 0 | 8,567 8 7 | 764 7 5 | 5,117 4 1 |
| Do. establishment ... | 4,068 0 0 | 4,017 12 0 | 50 4 0 | ... |
| Do. workshop ... | 7,000 0 0 | 2,693 14 0 | 4,306 2 0 | 2,398 6 9 |
| Tea shop ... ... | 300 0 0 | ... | 300 0 0 | ... |
| Well fund ... ... | 2,000 0 0 | 1,247 7 11 | 752 8 1 | ... |
| Usar fund ... ... | 5,000 0 0 | 4,984 14 3 | 15 1 9 | 1,789 1 8 |
| Miscellaneous ... ... | ... | ... | ... | 308 15 3 |
| Total ... | 76,356 0 0 | 66,576 7 11 | 9,779 8 1 | 16,202 2 9 |

Certified that the receipts in this office were checked in the manner prescribed in G. O. Circular No. 34, dated 5th October 1882.

T. W. HOLDERNESS,
*Director.*

APPEN

*Statement showing arboriculture receipt and*

| District. | Receipts. | | | | | | Total. |
|---|---|---|---|---|---|---|---|
| | 1885-86. | 1886-87. | 1887-88 | 1888-89. | 1889-90. | 1890-91. | |
| | Rs. | Rs. | Rs. | Rs. | Rs. | Rs. | Rs. |
| Dehra Dún ... ... ... | ... | ... | 33 | 5 | ... | 497 | 535 |
| Saháranpur ... ... ... | 1,284 | 914 | 787 | 3,111 | 968 | 1,902 | 8,966 |
| Muzaffarnagar ... ... ... | 2,805 | 3,280 | 3,456 | 5,107 | 3,258 | 3,306 | 21,212 |
| Meerut ... ... ... | 5,741 | 4,622 | 3,089 | 3,363 | 3,963 | 1,916 | 22,694 |
| Bulandshahr ... ... ... | 10,403 | 4,362 | 1,306 | 2,842 | 4,530 | 3,641 | 27,084 |
| Aligarh ... ... ... | 4,754 | 2,822 | 824 | 1,091 | 1,413 | 2,800 | 1,3704 |
| Total ... | 24,987 | 16,000 | 9,495 | 15,519 | 14,132 | 14,062 | 94,195 |
| Muttra ... ... ... | 717 | 550 | 455 | 957 | 1,222 | 1,597 | 5,498 |
| Agra ... ... ... | 1,775 | 1,283 | 1,001 | 1,476 | 1,885 | 3,042 | 10,462 |
| Farukhabad ... ... ... | 621 | 212 | 669 | 426 | 1,019 | 1,799 | 4,746 |
| Mainpuri ... ... ... | 1,597 | 1,551 | 619 | 814 | 1,189 | 1,070 | 6,840 |
| Etáwah ... ... ... | 160 | 193 | 394 | 155 | 292 | 1,137 | 2,331 |
| Etah ... ... ... | 923 | 610 | 638 | 762 | 782 | 1,200 | 4,915 |
| Total ... | 5,793 | 4,399 | 3,776 | 4,590 | 6,389 | 9,845 | 34,792 |
| Bareilly ... ... ... | 910 | 944 | 403 | 1,465 | 1,019 | 2,397 | 7,138 |
| Bijnor ... ... ... | 676 | 837 | 924 | 1,836 | 1,705 | 899 | 6,877 |
| Budaun ... ... ... | 729 | 815 | 612 | 924 | 686 | 1,300 | 5,066 |
| Moradabad ... ... ... | 1,012 | 840 | 1,545 | 3,961 | 2,726 | 1,599 | 11,683 |
| Sháhjahánpur ... ... ... | 310 | 434 | 288 | 1,150 | 610 | 1,765 | 4,557 |
| Pilibhít ... ... ... | 59 | 536 | 760 | 790 | 856 | 621 | 3,622 |
| Total ... | 3,696 | 4,406 | 4,532 | 10,126 | 7,602 | 8,581 | 38,943 |
| Cawnpore ... ... ... | 1,412 | 1,895 | 1,301 | 2,056 | 1,828 | 2,213 | 10,705 |
| Fatehpor ... ... ... | 849 | 461 | 804 | 524 | 387 | 1,460 | 4,485 |
| Bánda ... ... ... | 605 | 426 | 301 | 638 | 334 | 2,850 | 5,154 |
| Hamírpur ... ... ... | 386 | 551 | 277 | 321 | 262 | 1,709 | 3,506 |
| Allahabad ... ... ... | 546 | 768 | 533 | 941 | 618 | 1,382 | 4,788 |
| Jhánsí ... ... ... | 253 | 355 | 300 | 344 | 487 | 4,101 | 5,840 |
| Jalaun ... ... ... | 297 | 162 | 449 | 276 | 281 | 2,100 | 3,565 |
| Lalitpur ... ... ... | 107 | 299 | 168 | 192 | 106 | 2,938 | 3,810 |
| Total ... | 4,455 | 4,917 | 4,133 | 5,292 | 4,303 | 18,753 | 41,853 |
| Benares ... ... ... | 868 | 2,370 | 1,126 | 1,014 | 1,924 | 1,000 | 8,296 |
| Mirzapur ... ... ... | 375 | 517 | 313 | 864 | 514 | 1498 | 4,081 |
| Jaunpur ... ... ... | 1,050 | 1,414 | 4,079 | 2,929 | 2,736 | 2,085 | 14,293 |
| Gházipur ... ... ... | 74 | 146 | 280 | 443 | 552 | 990 | 2,485 |
| Ballia ... ... ... | 57 | 30 | 47 | 48 | 66 | 355 | 603 |
| Total ... | 2,424 | 4,477 | 5,839 | 5,298 | 5,792 | 5,928 | 29,758 |
| Gorakhpur ... ... ... | 27 | 100 | 146 | 113 | 544 | 1,380 | 2,310 |
| Basti ... ... ... | 47 | 84 | 81 | 272 | 282 | 700 | 1,466 |
| Azamgarh ... ... ... | 966 | 1,397 | 822 | 754 | 636 | 800 | 5,375 |
| Total ... | 1,040 | 1,581 | 1,049 | 1,139 | 1,462 | 2,880 | 9,151 |
| Almorah ... ... ... | ... | ... | ... | ... | ... | 300 | 300 |
| Garhwál ... ... ... | ... | ... | ... | ... | ... | 797 | 797 |
| Naini Tal ... ... ... | ... | ... | ... | ... | ... | ... | ... |
| Total ... | ... | .. | | ... | ... | 1,097 | 10,37 |
| Lucknow ... ... ... | 178 | 531 | 547 | 740 | 741 | 1,446 | 4,183 |
| Unao ... ... ... | 125 | 220 | 347 | 666 | 210 | 439 | 2,007 |
| Rae Bareli ... ... ... | 114 | 150 | 104 | 120 | 54 | 654 | 1,196 |
| Sitapur ... ... ... | 263 | 117 | 103 | 163 | 313 | 947 | 1,906 |
| Hardoi ... ... ... | 185 | 227 | 89 | 232 | 1,448 | 1,649 | 3,830 |
| Kheri ... ... ... | 33 | 14 | 48 | 52 | 18 | 300 | 465 |
| Total ... | 898 | 1,259 | 1,238 | 1,973 | 2,784 | 5,435 | 13,587 |
| Fyzabad ... ... ... | 122 | 538 | 1,355 | 849 | 594 | 584 | 4,042 |
| Gonda ... ... ... | 113 | 487 | 59 | 232 | 354 | 548 | 1,793 |
| Bahraich ... ... ... | 147 | 87 | 114 | 164 | 673 | 845 | 2,030 |
| Sultánpur ... ... ... | 103 | 249 | 615 | 392 | 473 | 900 | 2,732 |
| Partábgarh ... ... ... | 475 | 430 | 502 | 882 | 616 | 600 | 3,505 |
| Bara Banki ... ... ... | 265 | 191 | 183 | 528 | 1,286 | 1,320 | 3,773 |
| Total ... | 1,225 | 1,982 | 2,828 | 3,047 | 3,996 | 4,797 | 17,875 |
| GRAND TOTAL ... | 44,518 | 39,021 | 32,890 | 46,984 | 46,460 | 71,378 | 2,81,251 |
| Lucknow Exotic Plantation ... | ... | ... | ... | 43 | ... | ... | ... |
| „ Date „ ... | ... | ... | ... | 36 | ... | ... | ... |
| Agra Exotic „ ... | ... | ... | ... | ... | ... | ... | ... |
| Cawnpore Farm and Headquarters &c. ... | ... | ... | ... | ... | ... | ... | ... |
| Total ... | .. | ... | ... | 79 | ... | ... | ... |
| GRAND TOTAL ... | 44,518 | 39,021 | 32,890 | 47,063 | 46,460 | 71,378 | 2,81,251 |

DIX B.

*charges from* 1885-86 *to* 1890-91.

| Charges. | | | | | | Total. | Average receipts per year. | Average expenditure per year. |
|---|---|---|---|---|---|---|---|---|
| 1885-86. | 1886-87. | 1887-88. | 1888-89. | 1889-90. | 1890-91. | | | |
| Rs. | Rs. | Rs. | Rs. | Rs. | Rs. | Rs. | Rs. | Rs. |
| 337 | 550 | 400 | 400 | 448 | 102 | 2,237 | 89 | 373 |
| 1,344 | 1,846 | 1,739 | 1,797 | 2,100 | 974 | 8,800 | 1,494 | 1,633 |
| 2,662 | 3,547 | 3,338 | 2,863 | 3,528 | 6,773 | 22,711 | 3,535 | 3,785 |
| 1,440 | 1,700 | 1,884 | 1,891 | 2,029 | 7,809 | 16,753 | 3,783 | 2,792 |
| 1,561 | 2,481 | 5,000 | 2,100 | 3,642 | 3,065 | 17,849 | 4,514 | 2,975 |
| 2,995 | 3,435 | 3,374 | 2,400 | 2,738 | 2,637 | 17,599 | 2,284 | 2,933 |
| 10,339 | 13,579 | 15,735 | 11,451 | 14,485 | 21,360 | 86,949 | 15,699 | 14,491 |
| 2,002 | 2,002 | 2,000 | 2,545 | 1,980 | 638 | 11,167 | 916 | 1,861 |
| 1,884 | 2,543 | 3,317 | 2,572 | 2,792 | 1,591 | 14,699 | 1,744 | 2,450 |
| 673 | 1,350 | 1,159 | 1,800 | 1,798 | 498 | 7,278 | 791 | 1,213 |
| 952 | 1,300 | 1,196 | 1,300 | 1,219 | 1,225 | 7,192 | 1,140 | 1,199 |
| 1,124 | 905 | 1,358 | 1,086 | 1,396 | 80 | 5,949 | 389 | 991 |
| 912 | 1,513 | 1,395 | 1,200 | 1,195 | 720 | 6,935 | 819 | 1,156 |
| 7,547 | 9,613 | 10,425 | 10,503 | 10,380 | 4,752 | 53,220 | 5,799 | 8,870 |
| 1,950 | 2,506 | 2,487 | 2,376 | 2,393 | 956 | 12,668 | 1,190 | 2,111 |
| 675 | 900 | 800 | 861 | 892 | 1,931 | 6,059 | 1,146 | 1,010 |
| 735 | 1,263 | 811 | 1,300 | 1,124 | 765 | 5,998 | 844 | 1,000 |
| 1,177 | 1,600 | 2,047 | 2,100 | 1,600 | 1,713 | 10,237 | 1,947 | 1,706 |
| 1,074 | 1,497 | 1,238 | 1,197 | 1,173 | 270 | 6,449 | 759 | 1,075 |
| 150 | 100 | 187 | 283 | 470 | 972 | 2,162 | 604 | 360 |
| 5,761 | 7,866 | 7,570 | 8,117 | 7,652 | 6,607 | 43,573 | 6,490 | 7,262 |
| 1,326 | 1,789 | 1,990 | 1,798 | 1,799 | 4,297 | 12,999 | 1,784 | 2,166 |
| 1,130 | 1,215 | 1,433 | 1,300 | 1,400 | 811 | 7,289 | 748 | 1,215 |
| 3,044 | 2,348 | 3,577 | 2,758 | 2,493 | 246 | 14,466 | 859 | 2,411 |
| 1,350 | 1,101 | 1,800 | 1,498 | 1,476 | 340 | 7,565 | 584 | 1,261 |
| 1,185 | 1,580 | 1,831 | 1,768 | 1,593 | 1,455 | 9,412 | 798 | 1,568 |
| 2,298 | 2,999 | 2,900 | 3,000 | 3,000 | 946 | 15,143 | 973 | 2,524 |
| 1,801 | 2,282 | 2,200 | 1,997 | 2,100 | 214 | 10,594 | 594 | 1,766 |
| 3,749 | 4,338 | 4,200 | 3,800 | 4,500 | 502 | 21,089 | 635 | 3,515 |
| 15,883 | 17,652 | 19,931 | 17,919 | 18,361 | 8,811 | 98,557 | 6,975 | 16,426 |
| 682 | 1,000 | 981 | 942 | 997 | 2,940 | 7,542 | 1,383 | 1,257 |
| 1,275 | 1,899 | 1,375 | 1,254 | 1,036 | 601 | 7,440 | 680 | 1,240 |
| 1,656 | 2,211 | 2,010 | 2,098 | 2,292 | 1,051 | 11,318 | 2,382 | 1,887 |
| 374 | 500 | 600 | 727 | 850 | 682 | 3,733 | 414 | 622 |
| 365 | 459 | 500 | 500 | 500 | 96 | 2,420 | 101 | 403 |
| 4,352 | 6,069 | 5,466 | 5,521 | 5,675 | 5,370 | 32,453 | 4,960 | 5,409 |
| 1,050 | 857 | 1,199 | 1,343 | 1,400 | 765 | 6,614 | 385 | 1,102 |
| 272 | 319 | 400 | 312 | 500 | 197 | 2,000 | 244 | 333 |
| 443 | 800 | 800 | 800 | 800 | 591 | 4,234 | 896 | 706 |
| 1,765 | 1,976 | 2,399 | 2,455 | 2,700 | 1,553 | 12,848 | 1,525 | 2,141 |
| 181 | 250 | 250 | 250 | 267 | 2 | 1,200 | 50 | 200 |
| 240 | 313 | 450 | 598 | 799 | 120 | 2,520 | 133 | 420 |
| ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 421 | 563 | 700 | 848 | 1,066 | 122 | 3,720 | 183 | 620 |
| 1,069 | 1,456 | 1,510 | 1,464 | 1,808 | 804 | 8,111 | 697 | 1,352 |
| 375 | 360 | 346 | 404 | 494 | 206 | 2,185 | 335 | 364 |
| 554 | 545 | 565 | 978 | 845 | 164 | 3,651 | 199 | 608 |
| 705 | 936 | 857 | 932 | 989 | 433 | 4,852 | 318 | 809 |
| 824 | 677 | 1,128 | 1,240 | 1,355 | 239 | 5,463 | 638 | 911 |
| 104 | 122 | 144 | 194 | 300 | 31 | 895 | 78 | 149 |
| 3,631 | 4,096 | 4,550 | 5,212 | 5,791 | 1,877 | 25,157 | 2,265 | 4,193 |
| 405 | 381 | 556 | 767 | 712 | 599 | 3,420 | 674 | 570 |
| 346 | 849 | 500 | 629 | 594 | 210 | 3,128 | 299 | 521 |
| 694 | 702 | 889 | 890 | 900 | 431 | 4,506 | 338 | 751 |
| 700 | 700 | 600 | 700 | 899 | 468 | 4,067 | 455 | 678 |
| 446 | 769 | 630 | 576 | 600 | 276 | 3,297 | 584 | 550 |
| 652 | 996 | 1,000 | 1,000 | 1,500 | 1,127 | 6,275 | 629 | 1,046 |
| 3,243 | 4,397 | 4,175 | 4,562 | 5,205 | 3,111 | 24,693 | 2,979 | 4,116 |
| 52,942 | 65,811 | 70,951 | 66,588 | 71,315 | 53,563 | 3,81,170 | 46,875 | 63,528 |
| ... | 677 | 573 | 73 | 73 | 77 | ... | ... | ... |
| ... | | | 495 | 436 | 500 | ... | ... | ... |
| ... | ... | 400 | 400 | ... | 380 | ... | ... | ... |
| 400 | 400 | 250 | 350 | 548 | 397 | ... | ... | ... |
| 400 | 1,077 | 1,223 | 1,318 | 1,057 | 1,354 | ... | ... | ... |
| 53,342 | 66,888 | 72,174 | 67,906 | 72,372 | 54,917 | 3,81,170 | 46,875 | 63,528 |

## APPENDIX C.

*Statement showing the condition of usar in the North-Western Provinces and Oudh.*

| District. | Serial number of plot. | Situation of plot. | Area in acres. | Date of commencement of treatment. | Method of treatment. | Summary of remarks. |
|---|---|---|---|---|---|---|
| I.—Under the Irrigation Department. | | | | | | |
| Aligarh ... | 1 | At Pardilnagar, opposite the 24th mile of the Sikandra Rao Distributary, Ganges Canal, (*Plot A*). | 10·8 | 1868 | | |
| ,, | 2 | At Pardilnagar (*Plot* B). Adjoins Plot A. | 11 | 1881 | | |
| ,, | 3 | At Pardilnagar (*Plot C*). Adjoins Plots A and B. | 2·5 | 1884 | | |
| Etáwah ... | 4 | At Takran Bridge in mile 35, furlong 2, Etáwah Branch, Ganges Canal. | 60·13 | 1873 | | Experiment abandoned under G. O. No. $\frac{2252}{I\text{-}250\text{-}A}$, dated 3rd September 1891. |
| ,, | 5 | At Khandan Bridge in mile 78, furlong 5, Etáwah Branch, Ganges Canal. | 11·21 | 1883 | | |
| ,, | 6 | Near the Turaia Bridge, mile 55, furlong 6, Etáwah Branch, Ganges Canal. | 21·4 | 1888 | | |

| District. | Serial number of plot. | Situation of plot. | Area in acres. | Date of commencement of treatment. | Method of treatment. | Result of inspection by Director, Botanicial Department, 1889-90. |
|---|---|---|---|---|---|---|
| **II.—Under the Dept. of Land Records and Agriculture.** Cawnpore ... | 7 | Juhi, on an usar plain five miles from Cawnpore. | 102·25 | July 1882 ... | A.—*Preservation and extension of natural grasses.*—The plot has been enclosed partly by wire fence and partly by a ditch. A small portion is measured off into squares, and the improvement of the grasses and the diminution of the reh infected spots are periodically observed by Mr. Duthie. In the remaining area grass seeds have occasionally been sown broad east. In 1890, the grazing was sold after the rains. In 1891, the grass was cut and made into pay in October, but it proves to be of poor quality. The character of the grasses has undoubtedly improved by enclosure, though they are still for the most part poor and die down as soon as the rains are over.<br><br>B.—*Plantation of fuel and fodder trees.*—A large number of babul (*Acacia arobica*), dhâk (*butea frondosa*), ber (*Zizyphus*), nim (*Melia Indica*), shisham (*Dalbergia sissu*), siras (*albizzialebleck*), pipal (*Ficus religiosa*), gular (*Ficus glomerata*), bargad (*Ficus Indica*), and other hardly indigenous trees, as well as a number of exotic plants, such as salt-bush, sheep-bush, rain-tree, &c., have been planted from time to time after the following methods:—<br><br>(1) On slightly elevated spots where grass of a superior kind exists, and soil has not been washed away by erosion.<br><br>(2) On sides of mounds artificially raised, which offer protection to the plants when very young, from hot winds, seeds being planted on the sheltered side of the mound.<br><br>(3) In pits of the following description:—<br>(*a*) dug five feet deep, lined with Willesden rotproof paper, and filled with good soil from cultivated land;<br>(*b*) dug to the same depth, but refilled with the same soil and without any lining. | *Square No.* 1.—A patch of *dub* grass, measured in January 1888, 19½ × 6½ feet has now increased to 30 × 12 feet. There were several bare patches in this square two years ago, they are now completely covered with grass.<br>*Square No.* 3.—A bare patch, which was 30 feet wide in November 1889, has diminished to 22 feet.<br>*Square No.* 4.—Some paper mulberry plants here have grown about four feet since November 1889.<br>*Square No.* 6.—A patch of dhaman grass (*Cenchrus pennisetiformis*) measured 24½ × 15 feet in January 1888, has now increased to 30 × 18 feet.<br>*Square No* 8.—There was a thick deposit of reh salt here in January 1888, it is now nearly covered over with grass.<br>*Square No.* 11.—There was a bare efflorescent patch which measured 10 × 7 feet in January 1888, it was much reduced in size in November 1889, and is now nearly covered with grass.<br>*Square No.* 17.—A bare patch, measuring 19 × 6 feet, was recorded in November 1888, it was much diminished in size in November 1889, and is now almost covered. |

| District. | Serial number of plot. | Situation of plot. | Area in acres. | Date of commencement of treatment. | Method of treatment. | Result of inspection by Director, Botanicial Department, 1889-90. |
|---|---|---|---|---|---|---|
| Cawnpore ... | 8 | Amramau, on an usar plain four miles from Cawnpore. | 52 | July 1882 ... | Most of the land has been brought under the plough by means of embankments and manure, and now bears fair rice and cold weather crops. | |
| Aligarh .. | 9 | Gursikran, a plain seven miles from Aligarh. | 718 | August 1885... | This plain is treated much like No. 7 (Juhi). It has been protected from cattle by a ditch, and the grasses allowed to grow and cover the plain. A nursery is maintained to grow both indigenous and exotic plants, which are planted out where soil is tolerably good. The object in the case of this plain is to ascertain whether by excluding cattle for a number of years, the natural grasses have any chance of obtaining a permanent footing, and to find out which trees do best on a tolerably good class of usar land. | Mr. Duthie, after describing in detail the changes observed in each of the squares marked out for observation in Gursikran and Cherat, remarks :—It may be assumed from the facts above stated that the condition of the surface soil within these enclosed areas continues to improve, and that this improvement has been brought about by a chain of circumstances originating as the result of protection by enclosure.<br>By this means the grass vegetation has escaped the injuries caused by constant tread of cattle, and at the same time has profited by the retention and decay *in situ* of a large amount of vegetable matter which is ordinarily removed by grazing animals upon unprotected areas.<br>The action of the roots of healthy plants is a very efficient mechanical agency for improving the texture of such an impervious soil as that of the usar tracts.<br>Protection by enclosure appears therefore to be the best as well as the least expensive preliminary operation towards effecting reclamation. The record of periodical observations undertaken during the last few years shows that the grass vegetation has been steadily encroaching on, and in many instances has completely clothed, certain portions which were bare and efflorescent at the time when the ground was first taken up and enclosed; also that patches of *dub* and other high-class fodder grasses have increased in size and are to a great extent replacing the coarser kinds of grasses. |
| Ditto ... | 10 | Cherat, a plain five miles from Aligarh. | 242 | Ditto ... | This plain has been divided in two parts, one of which is worked as a combined arable and cattle farm. The following experiments are conducted in the other part. The whole is protected against cattle by a fencing of barbed wire :—<br>(1) Fuel and fodder trees are planted as in No. 9 (Gursikran.)<br>(2) The natural grasses are preserved and allowed to spread undisturbed.<br>(3) Exotic grasses are sown.<br>(4) A plot of about 25 acres is flushed with canal water in view to raising meadow grasses.<br>(5) An embankment has been raised round a piece of low land measuring about 15 acres in order to retain storm-water, and to see whether the land can thus be rendered fit for rice cultivation.<br>(6) The surface of a plot measuring 2·5 acres and yielding an efflorescence of *reh* is annually scraped to test the rate and rapidity of formation of such efflorescences. | The condition of the soil within these reserves as in all reh-infected land, is very unequal as to quality and texture, but as far as one can judge from outward appearances, I should say that large proportions of each reserve is now ready for what may be considered the secondary stage of operations towards reclamation, *viz.*, such as the Assistant Director, Mir Muhammad Husain, has so successfully carried out at Amramau and has already with favorable prospects commenced on a portion of the Cherat reserve. |

## APPENDIX D.

### Programme of the duties of Mr. Keventer.

The duties which Mr. Keventer will perform will slightly vary with the seasons. In August and September 1891, so far as his other duties will permit him, he will attend to the following work :—

(1) Keep a record of the feed of the dairy cattle at Aligarh, and of the produce from the same.

(2) Note the effect of different kinds of food given in various quantities upon the flow of milk and the condition of the dairy cattle, also the result of giving whey and buttermilk to dairy cattle.

(3) Keep a record of the average quantity of wet and dry dung obtained per head in a year.

(4) Make experiments with the view of obtaining liquid manure by different processes, such as soaking it in sand, litter, &c.

(5) Note the effect on the condition and manure of cattle when fed and kept in open yard, in barn and in boxes.

(6) Note the economy of fattening young stock.

(7) Teach the dairy staff at Aligarh to rear calves on drawn milk without allowing them to suck the dam.

(8) Make exhaustive experiments by means of chemicals and refrigerator, &c., as to whether milk can be kept fresh longer than usual in the hot season.

(9) Find out how butter can be kept longer in the hot season so that it could be exported to other towns.

(10) Note if cheese can be successfully made in the rainy season.

(11) Note whether it is more profitable to sell fresh milk, curd, *mawa*, *ghi*, butter or cheese.

(12) Find out if milk can be sent from Aligarh to Delhi and Agra markets.

From October to May 1892 Mr. Keventer will, in addition to the above, perform the following duties :—

(1) Make butter, cheese, and cream and push on their sale.

(2) Attend important shows and exhibitions.

(3) Give advice to any Military and Civil officers and other persons who may be desirous of starting dairy farms.

In June and July 1892 he will confirm the results of successful experiments carried on in the hot season, and prepare his report and statements showing the result of the work done by him in the course of the year.

Mr. Keventer will also carry out the orders that may be given to him from time to time by the Department of Land Records and Agriculture, and will regularly submit a monthly report showing the progress of the work done by him.

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# REPORT ON THE OPERATIONS

OF THE

# DEPT. OF LAND RECORDS AND AGRICULTURE,

## NORTH-WESTERN PROVINCES AND OUDH,

**For the year ending 30th September 1892.**

No. 96 OF 1893.

FROM

J. O. MILLER, ESQ.,

DIRECTOR, DEPT. OF LAND RECORDS AND AGRICULTURE,

N.-W. PROVINCES AND OUDH,

To

THE CHIEF SECRETARY TO GOVERNMENT,

N.-W. PROVINCES AND OUDH.

*Dated Cawnpore, the 28th January* 1893.

SIR,

I HAVE the honor to submit the annual report on the work of this Department for the year 1891-92.

### SECTION I.

#### MAINTENANCE OF VILLAGE RECORDS.

2. This section of the report appears separately in the Annual Report of the Board of Revenue. The extent to which the time of the Director is taken up with the performance of the duties classed under the general head of "Land Records" has been commented on in previous reports; and owing to the number of districts coming under settlement, regarding each of which a special report has to be furnished, it appears probable that for some time to come the tendency will be to a still further development of this side of the Department. During the past year Mr. Holderness submitted reports on the districts of Bánda, Hamírpur and Bara Banki; and the condition of the first two districts made specially searching inquiry necessary. Amongst the general measures carried out in this branch of the Department may be mentioned the revision of the Patwári and Kanungo Rules, a new edition of which was issued by Mr. Holderness for the North-Western Provinces; while he also prepared revised rules for Oudh, which have since been issued. A discussion which had for some years been going on as to the breakdown of the *lambardári* system in the permanently-settled districts ended in arrangements, the carrying out of which was left to this Department, for recording the liabilities of individual sharers for revenue in complex mahâls in a more convenient form than had hitherto been customary.

### SECTION II.

#### ANALYSIS OF DISTRICTS.

3. The proposals for the improvement of the pargana-book, to which reference was made last year, have since been submitted to Government: briefly described, their object is to connect the statistics in the pargana-book more closely than has hitherto been done with the facts and figures relating to each estate as ascertained at the time of

settlement. Improvements in the mahál and mauza registers, in which compilations of village statistics are made on a more elaborate scale than in the pargana-book, have also been suggested by Mr. Holderness. There is no doubt that the pargana-book is now more carefully kept up to date than before; but I have not noticed much sign of its proving a really useful hand-book to the District Officer: and I should be glad to see it improved on the lines suggested by Mr. Holderness. The difficulty is to provide the information required regarding each village without making the register too bulky.

## SECTION III.

### System of collection of Revenue and Rental in Precarious Tracts.

*Nil.*

## SECTION IV.

### Measures of Protection, including Arboriculture.

4. **Reclamation of Usar land.**—The experiments originally undertaken for the reclamation of *úsar* were carried out partly by this Department, partly by the Irrigation Department. The treatment of the plots near the canals was given up last year, and the only tracts still under observation are those for the management of which this Department is directly responsible. These are four in number, two near Cawnpore—Juhi and Amramau,—and two near Aligarh—Cherat and Gursikran. Originally these plots were taken up in connection with the scheme for forming fuel and fodder reserves, and at first they were all treated in the same way. They were enclosed by ditches or wire fences with the object of protecting the grass from cattle and allowing it to grow, seed, and decay freely. It was thought that the encouragement thus given to vegetation would lead to the formation of a good layer of surface soil, enriching the ground and promoting the vigorous growth of grasses. Subsequently the form of the experiment was changed in most of the plots, and attempts were made to reclaim the ground by cultivation. For an account of the progress made in the past year I am indebted to the Assistant Director, in whose charge the experiments are.

5. **Juhi Usar.**—At Juhi no change has been made in the original form of the experiment since it commenced ten years ago. The plot has been maintained strictly as a fuel and fodder reserve, and all changes in the vegetation resulting from enclosure have been carefully noted and recorded by the Director of the Botanical Department. Various hardy indigenous trees as well as a number of exotic plants, such as the salt-bush, the sheep-bush, the rain-tree, have been planted from time to time. The *babúl* (*Acacia Arabica*) and *nim* (*Melia Indica*) have hitherto done best; but it is noticed that many of the plants get stunted in their growth when their roots reach the underlying bed of kankar. There are now on the plot 650 babúl, 105 shisham (*Dalbergia sissu*), 90 nim, 80 bér (*Ziziphus*), 160 date palms and 135 miscellaneous plants. Shady trees like the nim and paper mulberry are reported to encourage the vegetation on the ground below; and their shade is believed to prevent the efflorescence of the salts of *reh* to the surface.

The typical *Usar* grass (*Sporobolus pallidus*) and another species peculiar to saline soils, *Chloris tetrastachya*, still grow abundantly; the former makes poor hay, but the latter is more nutritious. Several good fodder grasses have also obtained a footing, and some patches of land which up to 1888 had thick deposits of *reh* on them, are now covered with more or less valuable grasses. *Dub* grass (*Cynodon dactylon*) is by no means uncommon. The soil is reported by the Assistant Director to have considerably improved, and a comparison of the land inside and outside the fences convinces him of the success of the method of enclosure. Nine different kinds of grass seed, specially suited for *úsar* lands, were sown during the year according to directions received from the Director of the Botanical Department; but only one variety (*Pannicum halopus*) succeeded well. The soil is now good enough for cultivation, but no steps to plough up the land will be taken unless it appears that the Botanical Department are satisfied with the experiments

already made in the growth of grasses. The total expenditure up to the end of the year on this plot amounted to Rs. 2,462 and the receipts to Rs. 78. Larger receipts could have been obtained in recent years by letting the land for grazing; but this would have rendered the experiment useless.

The conclusion to which the Assistant Director's account of this plot points is that *úsar* reclamation to be successful must end in cultivation, and practical effect has already been given to this conclusion at two of the other reserves, Amramau and Cherat. However interesting as an experiment the successful cultivation of these plots may be, the result is not so valuable as it would have been had the path been pointed out to their profitable utilization as reserves of fuel or grass. The agriculturist shows himself sufficiently ready without special instruction to make inroads on the waste as soon as he finds that the outlay in reclaiming it is likely to be repaid.

6. **Amramau Usar.**—At Amramau the idea of forming a fodder reserve was given up after a three years' trial. A number of cattle and sheep were purchased and herded on the land to supply manure, and fields were marked out and embanked so as to hold rain-water. During the rains they were ploughed with a deep plough, and the rain-water allowed to percolate the sub-soil. After frequent ploughings the fields were well manured, and the next year were sown with rice. If the rice crop succeeded, a spring crop of barley or peas followed it. The land so reclaimed has been partly let out to tenants and partly cultivated under direct management. The reclaimed area rose from 10 acres in 1885 to 30 in 1888, and is now 39. The question of selling the tract is now under consideration. An offer of Rs. 2,000 was received and withdrawn, subsequently another of Rs. 2,050 was made, and I have recommended that it be accepted. As the experiment in so far as this plot is concerned is likely now to come to an end, the expenditure and receipts since the commencement have been shown in an appendix. If the expenditure incurred in the unsuccessful attempt to create a fodder reserve be deducted, the result would stand as follows :—

*Expenditure.*

| | Rs. a. p. | Rs. a. p. |
|---|---|---|
| Compensation for land ... ... ... | 58 0 0 | |
| Purchase of live-stock ... ... ... | 2,241 4 6 | |
| Feed „ „ „ ... ... ... | 1,091 15 0 | |
| Labour attending on live-stock ... ... | 1,255 4 0 | |
| Ploughing and other labour .. ... ... | 1,515 11 0 | |
| Seeds ... ... ... ... ... | 300 13 0 | |
| Construction of cattle-shed ... ... ... | 860 8 0 | |
| Maintenance „ „ „ ... ... ... | 136 10 0 | |
| Construction of well ... ... ... | 238 2 0 | |
| Farm implements ... ... ... | 100 15 0 | |
| Pay of supervisor at Rs. 7-8-0 per mensem ... | 735 0 3 | |
| Miscellaneous ... ... ... ... | 106 5 6 | |
| | | 8,640 7 9 |

*Receipts.*

| | | |
|---|---|---|
| Rent of land ... ... ... ... | 582 9 0 | |
| Sale of farm produce ... ... ... | 839 4 6 | |
| „ „ milk ... ... ... ... | 1,616 9 0 | |
| „ „ live-stock ... ... ... | 2,234 10 0 | |
| „ „ wool, skin, wood and kankar, &c. ... | 276 15 6 | |
| Valuation of live-stock still on the plain ... ... | 231 0 0 | |
| „ of live-stock transferred to Cherat ... | 938 0 0 | |
| „ of dead-stock on the plain ... ... | 55 0 0 | |
| | | 6,774 0 0 |

If the offer of Rs. 2,050 be accepted, there will be a slight gain of Rs. 183-8-3 on the experiment.

7. **Cherat Usar.**—The úsar is situated in the district of Aligarh, five miles from the town. It was acquired by Government in the year 1885 under the Land Acquisition Act at a compensation of Rs. 687-8-11. It is a block of unfertile land mostly charged with alkaline salts, more or less injurious to plant life. The area of the plot is 242 acres. Until the year 1889 the entire plot was maintained as a fuel and fodder

reserve, when half of it was marked off and enclosed by wire to try the experiment of reclamation by deep ploughing and manuring which had proved successful at Amramau. In 1890 tillage operations were commenced, and nine acres were brought under the plough; in 1891 34 acres were further reclaimed, and during the year under report 33 acres more have been broken up. Thus the total area brought under tillage is 76 acres. Of this 43 acres have been yielding very fair kharíf and rabi crops, and of the balance, *viz.*, 33 acres, broken up only since July last, 29¾ have been allowed to lie fallow—exposed to the atmospheric action—in order to prepare them for kharíf cultivation next June; and 3¼ acres have been thoroughly ploughed and manured with farmyard manure at the rate of 50 maunds per acre and been sown with mixed peas and barleys. During the year under report, of 43 acres reclaimed up to June 1892, 21¼ acres were let to tenants in the beginning of the current agricultural year on an annual rent of Rs. 170 or Rs. 8 the acre, and the rest are managed under departmental supervision. The following tables show the distribution of area during the two agricultural seasons, rabi and kharíf, of the past revenue year.

| Rabi. | | Kharíf. | |
|---|---|---|---|
| Crop. | Area in acres. | Crop. | Area in acres. |
| Wheat ... ... | 5·50 | Rice ... ... | 15·19 |
| Barley ... ... | 6·75 | Sugarcane ... ... | 1·06 |
| Peas ... ... | 1·25 | Fallow ... ... | 5 50 |
| Gram ... ... | 2·50 | Let to tenants ... | 21·25 |
| Fallow ... ... | 27·00 | | |
| Total ... | 43·00 | Total ... | 43·00 |

8. Of the spring crops wheat did well, the yield being 8½ maunds per acre in a plot in which bone-dust was used as manure, and 5½ maunds elsewhere. The yield of peas was very good, but gram gave a very poor outturn. The sowing of barley was delayed till the beginning of December by accumulation of rain-water on the fields, and the outturn was only 4½ maunds per acre; but it is believed that barley would do well if it had a fair trial.

9. *The kharíf crop.*—Of the five varieties of rice crops, two, *viz.*, *sathí* and *syamjira* were raised on a soil manured with common farmyard manure, while in the case of the remaining three no manure was applied. On the unmanured soil a variety of very fine rice, named *hiranj*, was grown, and it gave the largest yield. The úsar soil is specially adapted for its growth. The grain of this rice, as well as of others grown on the reclaimed úsar, is not inferior to that of the same varieties grown elsewhere. *Sathí* comes next with respect to outturn, but the quantity of manure used was large and the financial results less good than in the case of the preceding variety. *Syamjira* and the rest cannot at all be recommended owing to their poor yield.

The area allotted to sugarcane was $1\frac{1}{16}$ acres. The local variety, called "chin," was planted on two patches, one of which was manured with bone-dust at 3 maunds per acre and both were treated with farmyard manure 80 maunds per acre. The crops had not been cut when the Assistant Director visited the reserve, but he considered that they were doing very well. The taste of the cane was distinctly saltish, showing that it is a salt absorbing plant, a fact of some practical value. Thus where removal of saline matters from soils forms an object, the plantation of sugarcane would not be disadvantageous. The percentage of sugar in the cane appears, however, to be below the average. It must also be noted that the soil of Aligarh district is not, generally speaking, suitable for sugarcane.

10. *Cattle.*—A herd of cattle is kept at the farm in order to supply milk to the dairy and manure to the fields. At the end of the year under report there were 31 cows and 24 buffaloes: of the former, 9 were in milk and the rest dry. Of the buffaloes, 18 were of the Hissar breed, including 14 bought from Hissar in September.

11. *Arrangements for feeding cattle.*—The cattle were fed on bhúsa, linseed cake, cotton-seed, bhúsi and green food. In order to supply green food in summer juár was

sown early in the month of April, much in advance of the proper season, by means of artificial irrigation from canal water, and did very well. This experiment forms a new feature in our arrangements for securing green food when there is a scarcity thereof.

12. *Fuel and Fodder.*—The experiments in connection with fuel and fodder are fully detailed in Appendix C, and only a few general remarks on the grass and fuel plants are offered below.

The growth of the grass on the reserve has been more luxuriant than in the previous year. The yield amounted to 268 maunds, and the cost of cutting it was Rs. 8-6-0 at the rate of 6 pies per maund. The whole of this produce has been converted into ensilage, which will be used for feeding cattle in January and the following months.

The number of trees and their varieties are detailed in the following table:—

| Name of tree. | Number. |
|---|---|
| Babúl | 125 |
| Nim | 81 |
| Shísham | 78 |
| Jait | 15 |
| Jámun | 35 |
| Mahua | 15 |
| Labhera | 8 |
| Siris | 10 |
| Rain tree | 30 |
| Date palm | 180 |

The propagation of trees by seed has proved unsuccessful, except in the case of babúl (*Acacia Arabica*). Either the seeds failed entirely to germinate or the seedlings withered away. Of the planted trees many show a stunted growth owing to their roots having struck into the underlying bed of kankar.

13. The total receipts and expenditure of Cherat up to the end of the year are shown in the subjoined table; details are given in appendix F.

| | Expenditure. | Receipts. |
|---|---|---|
| | Rs. a. p. | Rs. a. p. |
| Usar reclamation, including cost of land, fencing, &c. ... ... | 4,755 4 4 | 455 13 1 |
| Live-stock ... ... ... ... ... | 9,793 9 9 | 2,990 1 6 |
| Cultivation ... ... ... ... ... | 1,085 9 10 | 457 0 6 |
| Total ... | 15,634 7 11 | 3,902 15 1 |

The difference of Rs. 11,731-8-10 represents net cost of reclamation hitherto incurred. From Appendix G it would appear that the valuation of the stock, building, &c., at the end of the year was Rs. 13,106.

The question of the profit or loss of the experiment therefore depends on the correctness of the present valuation of the reserve and its stock. If this is correct, there has been a slight profit.

14. **Gursikran Usar.**—The plain lies at a distance of seven miles from the town of Aligarh. It was acquired in the year 1885. In area it is 960 acres. The greater portion of this plot is reserved as a fuel and fodder reserve, while a small part has been brought under the plough. Till last year the entire culturable area, *viz.*, $81\frac{27}{32}$ acres, was occupied by tenants. Fields broken up by these tenants are held by them rent-free for two years, and in the third year a rent of Rs. 2-4-0 per pakka bigha is charged. The tenants have grown both rabi and kharif crops with some degree of success. In the course of three years $20\frac{5}{16}$ acres were thus reclaimed, but as the process of reclamation followed by the tenants was very slow and unsatisfactory the reclamation operations were taken under departmental management during the year under report, and $17\frac{1}{2}$ acres were brought under the plough in the following manner:—The gándár grass (*Leptochloa*

*fusca*) which grows abundantly on the úsar was first rooted out with a native hoe, and the area thus cleared was enclosed by an embankment 1½ foot high for holding rain water for a week, during which the water soaked into the soil. This was followed by deep ploughing twice with Watts' plough drawn by buffaloes (the bullocks being not strong enough for the heavy draught). Of the portion so treated $3\frac{7}{16}$ acres have already borne several varieties of rice during the last kharif season, 7½ acres are reserved for rabi cultivation and $1\frac{7}{8}$ for kharíf next year.

15. The preparation of the soil after being broken up for rabi sowings was carried out as follows:—

The native plough was first used in order to break up the clods turned over by the English plough, and two ploughings with Watts' plough followed. After another ploughing with the native plough, the ground was flattened with the *pátela* and ploughed with the country plough once more just before sowing. The 7½ acres above spoken of as reserved for rabi sowing have been treated in this manner. The rabi crops, as noticed last year, are frequently injured by a sort of fungus, locally known as "sehún." An experiment tried at the Cawnpore Farm of steeping the affected seed in a solution of copper sulphate previous to sowing failed, as the infected seed would not germinate. The experiment will be repeated next year with modified treatment. Where a wheat crop fortunately escapes the attack of this fungus, it grows exceedingly vigorously.

16. The plot under grass continues to show improvement. The growth of the grass is luxuriant, the predominant variety being the typical coarse úsar grass (*sporobolus pallidus*), which though good enough to be grazed down when green, makes poor hay for which it is difficult to find a market. The dáb grass (*Eragrostis cynosuroides*) is also common on the úsar.

During the year under report 282 maunds of grass were cut and stacked to feed the cattle of the Cherat Dairy. Some dry cows were also removed from Cherat in April and succeeding months to graze on a part of the úsar not under special grass experiments. Last year more than 2,000 maunds of grass were carried away by the grass-cutters of the 3rd Bengal Cavalry during the autumn manœuvres of the troops assembled at Aligarh, and a payment of Rs. 125 has since been obtained on account of it.

17. The trees are not doing very well. In certain places where a bed of kankar, varying from 2½ feet to 3 feet, underlies the surface layer of the reh they have become stunted in growth; but elsewhere hardy trees, such as babul (*Acacia Arabica*), shisham (*Dalbergia sissu*), ním (*Melia Indica*), dhák (*Butea frondosa*), are making fair progress. One hundred and thirteen date palm seedlings are alive but not doing satisfactorily.

18. The total receipts and expenditure of the Gursíkran úsar are given below:—

| Receipt. | Amount. | Expenditure. | Amount. |
|---|---|---|---|
| | Rs. a. p. | | Rs. a. p. |
| (1) Land Rent ... ... | 1,411 6 11 | (1) Land compensation ... | 1,440 12 0 |
| | ... | (2) Boundary ... ... | 251 15 0 |
| | ... | (3) Trees ... ... ... | 121 12 5 |
| (2) Grain ... ... ... | 192 9 9 | (4) Cultivation ... ... | 1,593 5 3 |
| (3) Grass ... ... ... | 1,043 11 9 | (5) Grass ... ... ... | 344 3 6 |
| | ... | (6) Building ... ... | 354 7 0 |
| | ... | (7) Establishment ... ... | 2,754 15 0 |
| (4) Miscellaneous ... ... | 45 3 0 | (8) Miscellaneous ... ... | 123 11 9 |
| (5) Irrigation recoveries ... | 510 4 9 | ... | ... |
| | 3,203 4 2 | Total ... | 6,985 1 11 |

19. **Arboriculture.**—The total length of avenues at the close of 1890-91 was given in last year's report as 5,157 miles; but it appears from the returns received from districts this year that the actual length was 5,182 miles, to which have now to be added 265 miles of new avenues planted during the year under report. The total length of avenues was thus 5,447 miles on the 31st March 1892.

The districts in which the largest additions of new avenues are reported to have been made during the year are Bulandshahr, Moradabad, Jhánsi, Mirzapur, Jaunpur, Rae Bareli and Bara Banki, in several of which districts substantial assistance was received from private persons. At the stage which arboricultural operations have now reached in these provinces, the maintenance of existing avenues as a rule absorbs the greater part of the funds at the disposal of District Boards, and the annual reports show that it is much better for the Boards to have a little work well done than to attempt large extensions of their avenues without due regard to the future maintenance of the trees that are planted. The Commissioner of Rohilkhand, who has added some very practical remarks to the reports from the districts of his Division, has pointed out clearly that it is impossible for young trees to be planted out, fenced and taken care of at the very low rates—in one case less than two annas per tree—reported in parts of his Division. The only result of extending operations over a length of road disproportionate to the establishment and the funds at the disposal of the Board is, as Mr. Cadell remarks, to bequeath to future years "an extensive legacy of empty *thálas* and cropped and stunted bushes." The poor results obtained for the expenditure incurred in the past in parts of Budaun is specially noticed by the Commissioner, whose advice will probably not be lost on the Board, who have now placed the District Engineer in special charge of their avenues. In the Agra Division also the Commissioner has found it necessary to point out that it is more important to maintain existing avenues than to plant new ones; and to call attention to the misplaced economy of insufficiently protecting young trees.

The following table shows by Divisions the number of miles under avenues and of trees planted during 1891-92 :—

| Division. | Length of avenues under operation during 1891-92. | Total length of avenues at the close of 1890-91. | Length of new avenues planted during 1891-92. | Total length of avenues at the close of 1891-92. | Total number of trees planted during 1891-92. |
|---|---|---|---|---|---|
| | Miles. | Miles. | Miles. | Miles. | Miles. |
| Meerut ... ... ... | 509 | 584 | 27 | 611 | 15,676 |
| Agra ... ... ... | 357 | 875 | 12 | 887 | 15,839 |
| Rohilkhand ... ... ... | 457 | 448 | 33 | 481 | 10,639 |
| Allahabad ... ... ... | 859 | 947 | 42 | 989 | 11,854 |
| Benares ... ... ... | 312 | 520 | 42 | 562 | 9,470 |
| Gorakhpur ... ... ... | 137 | 322 | 6 | 328 | 2,445 |
| Kumaun ... ... ... | 39 | 31 | 9 | 40 | 2,431 |
| Lucknow ... ... ... | 401 | 555 | 27 | 582 | 5,963 |
| Fyzabad ... ... ... | 377 | 900 | 67 | 967 | 7,596 |
| Total ... | 3,448 | 5,182 | 265 | 5,447 | 81,913 |

The number of miles planted in previous years and under operation in 1891-92 was 3,183 as compared with 3,001 in 1890-91, and the length of new avenues planted and under operation in the year under report was 265 miles as compared with 258 in the preceding year. The total number of miles under operation was thus 3,448 as compared with 3,259 in 1890-91, or 189 miles more.

The number of trees planted in 1891-22 was 81,913 as compared with 82,347 in the preceding year, and the expenditure on avenues was in all Rs. 59,987 as compared with Rs. 58,127. Of the total expenditure Rs. 44,363 was spent on the maintenance of avenues planted previously and Rs. 15,624 on new avenues.

20. Assistance from private individuals in the extension of arboricultural operation is reported to have been given in the districts of Bijnor, Cawnpore, Fatehpur, Allahabad, Benares, Jaunpur, Ballia, Gorakhpur, Rae Bareli, Sitapur, Gonda and Bara Banki. While the work done by private persons may be of great use, it is clear from the reports that careful supervision is necessary, and that some strictness is required in laying down and enforcing the conditions on which planting on roads is allowed. In Gorakhpur, where an unusually large amount of work has been done in former years by both landlords and tenants, the results of which are very fully set out in the report, some roads have been most successfully planted in this way, but others have been "shamefully neglected;" scarcely any of the trees have survived, and the work has had to be done over from the beginning by the Board. In Allahabad the number of trees planted by private persons rose from 3,913 to 10,032, but the Chairman remarks that "undoubtedly trees planted are very young and small and a large percentage die off; also tree-planting is made an occasion for encroachment on the roads." The reported number of trees planted by private individuals in this one district is nearly as great as the number planted by District Boards in the whole Division; and if there were any chance of the trees thriving the result would be extremely satisfactory; it is doubtful however whether such extensive operations have been or could be efficiently supervised, and the experience of other districts shows that in the absence of effective supervision tree-planting by private persons on roads is of little use. In Etáwah it has been found necessary to confine tree-planting by zamindárs and others to specified portions of roads, so as to keep their operations distinct from those under the control of the Board—a very necessary precaution. With reference to this district the Commissioner says, "I disapprove of tree-planting by zamindárs; they do it badly to begin with, and end by making it the excuse for monstrous claims." I have no reason to think that the results of allowing private persons to plant on the roads are so bad as to merit this unqualified disapproval, but looking to the labour that will be thrown on official establishments in keeping up the registers of owners and in inspecting the avenues, I think that District Boards ought to insist on the observance of conditions likely to make the planting a success, and I would suggest that the kinds of trees to be planted on each particular road, the minimum age of the seedlings, and the description of *thala* or protective railing to be provided should be distinctly specified beforehand. Some diminution of private enterprise would doubtless follow on these conditions; but the success of arboricultural operations cannot be estimated merely by the number of seedlings planted out.

21. The number of groves at the end of the year was 83, or one less than last year; and their area 563 acres. The expenditure on groves was Rs. 1,876 or Rs. 536 less than in the previous year.

22. The number of nurseries maintained was 204 as compared with 195 in 1890-91. At the beginning of the year there were 269,664 trees in the nurseries and 110,375 were added, while 133,646 were taken out, leaving 246,393 in stock at the close of the year. The expenditure on nurseries was Rs. 9,989 as compared with Rs. 9,591 in the preceding year.

In regard to the maintenance and allocation of nurseries the policy of District Boards varies considerably. Some Boards prefer to transport the trees to be planted out from one central nursery; others have small nurseries in the neighbourhood of any road on which planting operations are being carried on. The districts of Benares and Bareilly apparently trust to obtaining the necessary plants privately and maintain no nurseries; but in the latter district the attempt to dispense with nurseries has not been a success, to judge from the remarks of the Commissioner. On the other hand, it may be doubted whether 19 nurseries are really required in Bánda. It must be left to District Boards on a consideration of the operations they intend to undertake, and of the possibility of purchasing privately suitable trees for planting to decide what nurseries are required and where they should be located; but the subject is worth the special attention of the Boards and should not be left to chance or to previous procedure to settle.

23. A statement showing the receipts and charges in each district for the last six years is given in Appendix B, and the following table shows the expenditure and receipts of each Division during the year under report :—

| Division. | Receipts. | | | Charges. | | | |
|---|---|---|---|---|---|---|---|
| | Loppings and fellings. | Fruits, grass, &c. | Total. | Avenues. | Groves and nurseries. | Loppings and fellings. | Total. |
| | Rs. | Rs. | Rs. | Rs. | Rs. | Rs. | Rs. |
| Meerut ... ... | 10,514 | 1,066 | 11,580 | 11,017 | 2,010 | 39 | 13,066 |
| Agra ... ... | 4,407 | 1,824 | 6,231 | 8,941 | 1,932 | 93 | 10,966 |
| Rohilkhand ... | 1,920 | 4,812 | 6,732 | 7,677 | 718 | 29 | 8,424 |
| Allahabad ... ... | 2,829 | 1,119 | 3,948 | 15,782 | 2,148 | 63 | 17,993 |
| Benares ... ... | 1,884 | 1,271 | 3,155 | 5,259 | 994 | 197 | 6,450 |
| Gorakhpur ... | 694 | 456 | 1,150 | 2,136 | 703 | 107 | 2,946 |
| Kumaun ... ... | ... | 180 | 180 | 240 | 860 | ... | 1,100 |
| Lucknow ... ... | 1,236 | 753 | 1,989 | 4,180 | 1,868 | 6 | 6,054 |
| Fyzabad ... ... | 1,829 | 1,555 | 3,384 | 4,755 | 632 | 76 | 5,463 |
| Total ... | 25,313 | 13,036 | 38,349 | 59,987 | 11,865 | 610 | 72,462 |

The receipts amounted to Rs. 38,349, and were less by Rs. 15,214 than those of the previous year. The decrease was most marked in the Meerut Division, where the receipts fell in Muzaffarnagar from Rs. 6,773 to Rs. 4,235 ; in Meerut from Rs. 7,809 to Rs. 1,840 ; in Aligarh from Rs. 2,637 to Rs. 1,153. In Muzaffarnagar the decrease was chiefly in receipts from sale of trees ; but there was also a decline in the proceeds from sale of grass and from loppings. In Meerut the income of 1890-91 was unusually large owing to the great number of trees felled and sold. In the year under report 711 trees were felled as compared with 2,912 in the year before, but unless these were unusually small the price they fetched appears to be inadequate. In Muzaffarnagar 427 trees were felled and fetched Rs. 3,835 ; while 711 trees in Meerut sold for only Rs. 1,646. In Aligarh there were unusually large receipts in 1890-91 owing to extensive clearances of superfluous roadside trees. In the Allahabad Division there was a notable diminution in receipts in Cawnpore, Allahabad and Jhánsi. In Cawnpore in the previous year the income was much larger than usual owing to the clearance and disposal of a large number of *babul* trees that were interfering with the regular avenue trees on the roads, and in Allahabad the decline is attributed to a bad fruit season, a cause which also seriously affected the receipts in the district of Benares. The total expenditure was Rs. 72,462 as compared with Rs. 71,378 in the previous year. The details of the charges are :—

| | Rs. |
|---|---|
| Avenues ... ... ... ... ... ... | 59,987 |
| Groves ... ... ... ... ... ... | 1,876 |
| Nurseries ... ... ... ... ... ... | 9,989 |
| Loppings and fellings ... ... ... ... ... | 610 |
| Total ... | 72,462 |

Over the whole province the charges exceeded the receipts by Rs. 34,113. In the Meerut Division there is ordinarily a slight increase of receipts over expenditure owing to the large income derived from the avenues of the Muzaffarnagar, Meerut and Bulandshahr districts ; but this year owing to the fall in the income of the two former districts the expenditure is considerably in excess of the receipts. In the Agra Division the only district in which there is any approach to equilibrium between receipts and expenditure is Mainpuri ; and it would seem from the Commissioner's remarks that except in Farukhabad the District Boards have not given much attention to arboriculture. In Etáwah, which claims to have 360 miles of avenues, the average receipts during the last six years are Rs. 269 only. In Bijnor, Moradabad, Pilibhít, Cawnpore, Benares, Jaunpur and Fyzabad the average receipts from arboriculture exceed the expenditure. The improvement of income from this source must neces-

sarily in some cases be slow; but there are districts in which it is quite possible to increase the receipts by careful management. Five years ago the income in Bara Banki was only Rs. 183; since then it has gradually increased, and during last year was Rs. 1,523 or somewhat more than the expenditure, a result that must be due rather to good management than to any exceptional windfalls. The Commissioner of Gorakhpur has impressed on the District Boards of his Division the necessity for exercising a close supervision over their income, and his instructions will, I trust, be acted on. The part of the country in which arboriculture is most expensive to carry on and brings in the poorest return is Bundelkhand, as the following statement of average receipts and expenditure shows:—

| | Average receipts. | Average expenditure. |
|---|---|---|
| | Rs. | Rs. |
| Bánda ... ... ... ... ... | 365 | 2,833 |
| Hamírpur ... ... ... ... ... | 376 | 1,521 |
| Jhánsi ... ... ... ... ... | 706 | 6,995 |
| Jalaun ... ... ... ... ... | 277 | 2,130 |
| And to these may be added— | | |
| Mirzapur ... ... ... ... ... | 496 | 1,410 |
| Total ... | 2,220 | 14,889 |

In some of these districts arboricultural operations have at one time or another been carried on with unusual energy, but the financial results are certainly not very encouraging as yet, and though arboriculture is not promoted to yield a profit, I think it might reasonably be expected that the continuously large expenditure would produce better results.

24. The management of arboricultural operations is usually left by the District Boards in the hands of tahsíldárs; but better results are obtained in some districts by entrusting it to the District Engineer; and where that officer takes an interest in the matter I agree with the Commissioner of Agra that his supervision is likely to be the most effective.

It is impossible to judge of the general efficiency of arboricultural operations in each district merely from the reports submitted, though some of them, such as that from Gorakhpur, are very clear and interesting. A better general idea is obtained from the remarks of the Commissioners, who have had the opportunity of seeing the actual work done, and the criticisms of the Commissioners of the Agra, Rohilkhand and Gorakhpur Divisions should be of much assistance to the District Boards in calling their attention to defects in the present system of management. The Commissioner of Rohilkhand takes frequent exception to the description of trees planted out. A list of trees suitable for planting and instructions regarding the construction of suitable guards or *thalas* were given in this Department's Circular No. 5 of 10th July 1880.

## SECTION V.

### AGRICULTURE, INCLUDING EXPERIMENTAL FARMS.

25. **Cawnpore Experimental Farm.**—The following remarks refer to the kharíf harvest of 1891 and the rabi of 1892. A detailed account of the experiments at the farm will be found in the annual report.

The season was, on the whole, unfavourable. Light showers in May and June facilitated the preparation of fields for the kharíf and rabi crops respectively; but the regular rains did not commence till late in July, and the kharíf sowings were consequently very much delayed, while the crop further suffered from the heavy and continuous rainfall of August and September. The rabi crops, on the other hand, were sown at the right time, and there was every prospect of an excellent harvest up to the end of February; but in March high and hot winds set in unusually early and shri-

velled up the grain. The outturn was in consequence much less than had been expected. The average yield of maize was 933lbs. per acre, and of wheat 1,133lbs. as compared with 1,172 and 1,300lbs. in the previous year.

26. As noticed in previous reports, the experiments are conducted chiefly with wheat in the rabi and maize and cotton in the kharif season. The main objects of the experiments carried on in the year under report were to determine the effect of—

(1) manures of various descriptions ;
(2) deep and shallow ploughing ;
(3) early and late sowing ;
(4) different methods of sowing ; and
(5) the use of sulphate of copper as a preventive against rust.

Where maize is grown for experimental purposes, the Jaunpur variety, which is superior to the local staple, is used. The results of the experiments with maize this year were inconclusive in regard to the advantages of the different manures used, as owing to the excessively heavy rain the manures were washed from one plot to another, and some plots treated with highly nitrogenous manures gave a less outturn than unmanured plots. In the rabi experiments with wheat it was found that sheep-dung, cow-dung, sheep-dung with gypsum, cow-dung with gypsum, fresh indigo refuse with lime and green indigo ploughed in with gypsum, furnished very good results ; but from a financial point of view the most successful results were obtained by the rotation of indigo and wheat, the indigo crop being sold for dye and the roots ploughed in for manure. The ploughing in of hemp has also been shown to add considerably to the outturn, and a still larger yield is obtained by the addition of gypsum ; but the increase is not sufficient to cover the cost of the gypsum used. The application of gypsum to indigo was again tried for the fourth year in succession, and the results were again successful. Contrary to former experience, a larger yield was obtained this year in the plot in which gypsum was applied as a top dressing than in one in which it was mixed with the soil at the time of sowing.

27. Experiments made during a term of nine years have established the economy of using an improved plough for wheat crops in the light dúmat soil of the farm instead of the ordinary native plough. No particular advantage has been gained by using a very deep plough, but the Watts or "Kaisar" plough, which goes to a depth of 5 inches and can be easily drawn by ordinary bullocks, has been shown to prepare the soil as efficaciously as the native plough, and much more expeditiously and cheaply. The saving in cost on the farm is estimated at Rs. 4 per acre.

28. Early sowings of maize and cotton have given better results than the late sowings, and the increase in outturn is sufficient to cover the cost of artificial irrigation. The experiments show that where canal water is available it is advantageous to sow maize and cotton, especially the latter, a month in advance of the rains. The plants get a start before the rains commence, and are less likely to be choked by weeds when the rains prove heavy and continuous.

29. Experiments to test the advantage of sowing sugarcane in the manner followed in the West Indies have been made since 1887, and until the present year the results have always been in favour of the native method. This year the outturn in the two fields was the same. The advantage of keeping sugarcane plants for a second year's crop was again demonstrated.

30. An experiment of steeping rust-infected wheat seed in a solution of sulphate of copper before sowing, with a view to prevent rust in wheat, gave inconclusive results, and will require to be repeated.

31. The cultivation of a few foreign varieties of grain was continued. Canadian oats have been found to give a very large outturn of straw, but the yield of grain has not as yet been satisfactory. None of the foreign barleys gave a better outturn than the local indigenous variety. The Swedish barley, with an outturn of 624lbs. per acre, showed the best results.

Of the different varieties of Indian and foreign wheat grown experimentally, the Muzaffarnagar variety gave the largest yield again, *viz.*, 1,334lbs. per acre. The Sindhi wheat, which headed the list last year, gave a less outturn this year than the red Panjábi and Buxar wheats, their respective yields being 629, 947, and 913lbs. per acre. Among the imported wheats, the Adelaide variety alone did well, with an outturn of 1,016lbs. per acre. The foreign varieties still require many more waterings and take a longer time to ripen than the indigenous varieties; they have not yet become acclimatized.

32. The cultivators in the neighbourhood of the farm recognise the advantage of using an improved plough. They also know perfectly well that the chain pump raises much more water from a depth of 5 to 20 feet than either the swing basket (*béri*) or the leather bucket (*charsa*). They take these implements on hire very readily, and an attempt is being made, as suggested by the Government last year, to arrange for their sale on the hire system.

33. An Arab stallion has, for some time, been kept at the farm for the encouragement of horse-breeding. He was at first not successful as a foal-getter, but several mares are now in foal to him; and the number sent to him is increasing, so that it may become necessary to charge a fee for his services.

PRIVATE FARMS.

34. **Meerut Demonstration Farm.**—This farm was originally started as a model farm by the Department of Agriculture with the sanction of Government, but was made over in 1888 to Chaudhri Debi Singh, Rai Bahádur, under whose management it has been since then. Its area is 53 acres.

The following improved implements are used at the farm :—

Plough—

(1) Watts',
(2) Kaisar;
(3) Duplex,
Chaff-cutter,
Grinder.

*Kharif.*— The area on which kharif experiments were conducted was 20 bíghas, divided into 23 plots. Six of these plots were sown with foreign varieties of cotton experimentally and manured with poudrette at the rate of 200 maunds per acre. The Garo Hill variety gave the largest outturn. Experiments with cotton were also tried in five plots, and different kinds of manure used, *e.g.*, horse-dung, rotted straw, farmyard manure and kiln ashes. The last two manures proved most beneficial.

Early and late sowing experiments were also made with Nankin and country varieties of cotton in four plots. The early sowing of cotton yielded the best results. Eight plots were cropped with maize to test the effect of various manures. The plot treated with sheep-dung yielded the largest outturn.

*Rabi.*—The area in which rabi experiments were tried was 40 bíghas, divided into 6 fields. The details of the series of experiments are given below :—

(1) Experiments in nine plots were tried with a view to ascertain the effects of different kinds of manure on wheat. Poudrette and sheep-dung gave the largest outturn.

(2) In 10 plots experiments were conducted in order to determine the effect, especially, of some manures that are left unnoticed by the ordinary cultivator. Silt and road scrapings proved most beneficial.

(3) Six varieties of Canadian wheat were tried, the treatment being in all cases the same. Ordinary farming and manure was applied. The Red Fife variety yielded the largest outturn. White Fife stood next.

(4) Experiments were tried in eight plots in order to determine the effect of green manuring on wheat, with the result that ploughing in of a green crop of hemp gave the largest outturn.

(5) Nine different kinds of mixed cereals were sown in order to ascertain their comparative outturn. The mixed crops of wheat and gram, and wheat, barley and gram gave the best results.

(6) Different varieties of oats were also sown on six plots, each being treated with farmyard manure (280 maunds per acre). The Prize Chester variety of oats yielded the largest outturn, but the grain was thinner than that of the ordinary and the White Egyptian oats.

(7) Experiments were also conducted in order to ascertain the yield of eight kinds of foreign barley as compared with the indigenous variety. The "Polar Six-rowed" gave the largest outturn.

(8) To determine the effect of deep and shallow ploughing on the yield of wheat eight plots were ploughed with different ploughs and sown with Muzaffarnágar wheat at 1 maund, 15 seers per acre. The plot ploughed 5 inches deep with Watts' plough stood first in point of outturn.

35. *The Lyall Farm, Ujhauli,* belongs to Chaudhri Said-ud-din Husain of Budaun. To the 29 acres of which it was originally composed, five acres of land reserved for grafts and botanical purposes were this year added.

The experiments made included trials with 117 different varieties of seed with the result shown in the following table :—

| Name of cereal. | Number of varieties sown. | Varieties which proved most successful. |
|---|---|---|
| Wheat ... | 31 | Buxar, Pissi, Mundia, Muzaffarnagar, Mexican and Gold Grain Palestine. |
| Barley ... | 10 | Black Tartary and Canadian. |
| Cotton ... | 13 | Egyptian and Garo Hills. |
| Peas ... | 17 | Sutton's. |
| Mustard ... | 3 | China. |

Of the various manures tried saltpetre and indigo refuse gave the best results. The manager is in favour of deep ploughing, and expresses a preference for tank water for irrigation.

A seed store has been attached, and indents from 157 cultivators for seed were met. Owing to high prices the demand for seeds was less than usual.

A special work which the farm has undertaken is to hold an annual show for exhibits of farm produce. The last was held on the 19th June and was well attended.

The produce of this farm obtained a 1st prize in the last Etáwah Show, where it was sent for exhibition, and the proprietor appears to devote a creditable amount of energy to its management. It was visited during the year by the Collector and Judge as well as by the Assistant Director.

36. *The Jatao Farm* of 70 acres is owned by Kuar Karan Singha of Agra. Wheat, juár, mangold and Guinea grass were cultivated experimentally during the last year. The experiment with Guinea grass proved a complete failure as the plants dried up after transplantation, but the mangold crop yielded a profitable outturn.

37. *Babu Lachman Parshad's Farm.*—The experiments conducted by Babu Lachman Parshad Barma, the Director's Personal Assistant, at his private farm, on ground which he has reclaimed near the Government Experimental Farm, are simple in their nature and such as an ordinary cultivator can easily adopt.

The rotation experiment mentioned in last year's report will be repeated next year, and that for determining the value of gypsum to leguminous crops was not tried during

the year under report. Leaving these two out of account, the number of experiments was the same as last year. These are briefly noted below :—

(1) *Farmyard manure*, vs. *ashes*.—It was noticed last year that burnt cow-dung loses much of its fertilizing properties as manure, owing to loss of nitrogen by burning, but that an addition of saltpetre to the ash before application restores the nitrogen so lost, to a considerable extent. This fact is confirmed by the results of this year's experiments, as the plot treated with ash alone yielded 10·25 maunds, whereas the one in which a mixture of ash and saltpetre was used gave 13·81 maunds per acre, which is not much below the yield of the plot treated with unburnt dung, which gave 15·62 maunds per acre. The treatment of these plots during the year under report was the same as last year, except that they were watered four times each, instead of three.

(2) *Quantitative Experiments with farmyard manure*.—This experiment has again established the fact that an increase in the quantity of farmyard manure increases the produce proportionately. As in last year, there were 4 plots under this experiment, which were manured at the rate of 100, 200, 300, and 400 maunds per acre, and their respective outturns amounted to 8·25, 11·00, 17·00, and 18·50 maunds per acre.

(3) *Mixed crops*.—Only two mixtures were tried under this experiment during the year under report. In one plot a mixture of *juár* and *til*, and in the other, of wheat and rapeseed were sown with the result that *til* gave 6 seers, wheat, 11 maunds and rapeseed 17 seers per acre. The *juár* was sold standing for Rs. 11-2-0 the acre.

(4) *Imported seed*.—Farukhabad and hill potatoes were sown in plots of $\frac{1}{10}$th of an acre each, manured with 400 maunds per acre of cow-dung; the former yielded 94·25 maunds and the latter 111·25 maunds the acre.

The most interesting feature of this farm is the improvement in the condition of the soil, brought about by embankment, careful tillage operations, and general good management. Formerly much of the land consisted of barren ravines, which have been successfully levelled and converted into arable fields of considerable fertility.

38. *Porter Agricultural Association*.—This association was founded under the patronage of Mr. Porter, the late Collector of Allahabad. It has no special farm of its own, but works on the general scheme of the improvement of agriculture. The several branch associations attached to it submit reports on the agricultural operations of their respective parganas, while the central association compiles and publishes them for general information. The last report issued refers to the year 1298 fasli, and describes the measures taken for the spread of sugarcane cultivation, the introduction of iron sugarcane mills and the encouragement of irrigation by the members and others in the southern parganas of the Allahabad district. Experiments in wheat growing and in the use of various kinds of ploughs have also been undertaken under the auspices of the association of which Rai Mahabir Prasada Narain Singh, Bahádur, of Baraun, is the leading member.

39. *The Khairandeshnagar Farm*, owned by Babu Sita Ram in the Sitapur district, has not been reported on before, and only a brief account of it has now been received. It is some 40 acres in extent. A number of cows and a bull from Hissar are kept at the farm for breeding purposes. Kharíf experiments were conducted with sugarcane with success, but fodder crops and *urd* suffered considerably on account of excessive rains. Experiments with different varieties of wheat gave inconclusive results owing to want of irrigation. Most of the improved implements are in use at the farm. Babu Sita Ram informs me that he has attempted to reclaim some usar in his neighbourhood in the manner followed at Amramau, but without success as yet. He believes that the usar with which he has to deal is more intractable.

40. **Saharanpur Botanical Gardens.**—The season was not, on the whole, a favourable one for gardening operations. The rainfall was exceptionally heavy and was badly distributed; the monsoon did not break till the end of July; and nearly half of

the whole rainfall was in the one month of August. The fall was too heavy while it lasted, and it did not last long enough. On the other hand, the winter was mild and little damage was done by frost.

41. The expenditure on the Saháranpur and Mussoorie gardens together amounted to Rs. 19,951 as compared with Rs. 20,144 in the previous year, while the cash receipts were Rs. 16,833 as compared with Rs. 16,323. If to the cash receipts be added the cost of seeds and plants supplied gratis to soldiers' gardens (Rs. 2,518), and to public gardens in India and elsewhere, as well as the indirect benefit to Government from the supply of drugs at reduced rates to the Medical Department, the total receipts amount to Rs. 20,104, and are slightly in excess of the expenditure. The gardens have been for some years practically self-supporting.

42. Numerous trees and plants of exotic origin are being experimentally cultivated in the gardens or are under observation. The distribution and sale to the public of useful and ornamental trees and plants was actively carried on; and in all 78,312 plants and cuttings were distributed as compared with 66,928 in 1890-91. The sale of seeds was on much the same scale as in the previous season. For want of funds no special improvements in the garden or buildings were carried out during the year.

The failure of the fodder plant, *Lathyrus sylvestris*, confirms the result of the experiments made at Lucknow that the plant is unsuited to this part of the country. The important experiments made to raise sugarcane from seeds are still, as at Lucknow, in the initial stage, no definite success having as yet attended the sowings made in previous seasons. Further sowings, which it may be hoped will be more successful, will be made; but it is evident that the experiment is one that will require much skill and patience to bring to a successful conclusion.

43. **Lucknow Horticultural Gardens.**—The season was very unfavourable for gardening operations. Cold and rainy weather in February, which destroyed the mango blossom, and rendered the crop one of the poorest on record, was followed by an unusually long period of heat and drought owing to the delay of the monsoon, which did not set in fairly till the very end of July. The usual winter rains failed, and hot winds, that proved very injurious to vegetation, began early in March. Still the gardens would not have suffered much from the season but for the disastrous effects of the high flood of the Gumti in October 1891. The arboricultural nursery grounds were under several feet of water for over a week; and nearly all the young trees died; the exotic plantation was similarly submerged but suffered less; while in the shrubberies and fruit-tree nurseries several thousand plants and cuttings of ornamental shrubs and a large stock of young limes and other fruit-trees were destroyed. It is estimated that about 7,000 mango seedlings were lost; and much damage was also caused to the plantation of grafted mangoes.

44. From the gardens 2,529 fruit-trees were sent out, and from the arboricultural nursery 3,369 plants and young trees as compared with 4,599 and 7,030 in the previous year. The falling-off is attributed rather to a diminution of the demand owing to the unfavourable character of the season for planting than to the losses in the plantations and nurseries.

The demands for acclimatized vegetable and flower seeds, however, increased; of the former 177 lbs. of seeds were sold in place of 80; and the receipts from sale of flower seeds rose from Rs. 886 to Rs. 898.

45. Numerous experiments were, as usual, carried on to test the possibility of improving indigenous or acclimatized plants and trees or of introducing new varieties. The cultivation of the paper mulberry having proved, as in previous years, an expensive and unprofitable experiment, has been discontinued. The increasing demand for palms and other ornamental plants has necessitated the enlargement of the plant-house. Two store-sheds, ruined by the floods, have been re-built, and the damage done to the fence of the nursery repaired. It is to be regretted that no success has yet attended the attempt to obtain European or Eurasian apprentices.

46. Notwithstanding unfavourable seasons and damage done by floods, the financial results compared favourably with those of other years. The grant for the gardens is Rs. 15,000, and the whole of this was, as in the previous year, expended. The receipts (exclusive of Rs. 1,500 contributed from nazúl funds) were Rs. 12,045 as compared with Rs. 12,146 in 1890-91.

47. **Motesar Garden.**—The nursery was transferred from the Almora (formerly Kumaun) district to the Naini Tal district on the 15th October 1891, owing to the readjustment of district boundaries. It was managed throughout the year by Mr. Seers of the Rámgarh Tea Estates, who obtains an allowance for the visits he makes to the nursery.

The year 1891 was a most disastrous year for potatoes in Kumaun generally, and the Government garden did not escape from the general failure of the crop caused by the delay of the monsoon, there being practically no rain before the 25th of July. From 40 maunds of potatoes planted the total yield was about 300 maunds, a very poor return.

The absence of hail-storms was favourable to the fruit trees in the gardens, which usually suffer severely from hail. About 200 trees were sold to European planters and 450 to native planters; while 1,300 trees were grafted during the year. Some 20 maunds of apples were disposed of, but pears have not as yet been a success at Motesar. It is proposed to close the road to Bhim Tal which passes through the nursery, and to construct a new road instead along the upper boundary of the garden.

The total receipts amounted to Rs. 1,918 against Rs. 1,523 in the preceding year; and the total expenditure to Rs. 2,804 against Rs. 4,495 in the year 1890-91.

48. The remarks made by the Government in the review of last year's report regarding the fall in the price of hill potatoes attracted the attention of the Secretary of the Upper India Chamber of Commerce, who pointed out that prices in the plains had not fallen very low, and that if the cultivators failed to obtain remunerative rates, the cause must be the inefficiency of transport, the interception of profits by middlemen, or the failure of the hillmen to bring their crop into the market sufficiently early in the season. It has been ascertained that the fall in price was brought about by a variety of causes not likely to recur in combination, but the views of the Secretary to the Chamber as to the possible benefit of establishing local depôts, and arranging for through booking of consignments of potatoes have been communicated to the railway authorities, who are giving this trade all possible encouragement. The great difficulty is of course the expense of transport in the hills.

49. **Khushru Garden, Allahabad.**—As mentioned in previous reports, some 17 acres of the garden have been taken up for the Allahabad water-works at an estimated loss to the gardens of Rs. 1,500 a year. It was expected that this loss would be compensated by the supply to the garden of water free of charge; but the connections have not yet been laid down; and the gardens have had to pay for all the water used up to the present time. The pipes required have now been received and will shortly be laid down. A large sum has again been spent on improvements. The grounds round the storage tanks have been laid out in grass and walks, which are reported to have made the garden doubly attractive; 2¼ more acres of land have been trenched and manured; the repairs to the central road, which passes through the gardens, have been completed; and the plant houses re-built and greatly enlarged. The number of plants added to the gardens was 124.

The total receipts amounted to Rs. 2,056 against Rs. 2,048 in the preceding year; and the total expenditure to Rs. 5,000 against Rs. 4,997 in the year before.

50. **Taj Gardens, Agra.**—The accounts of these gardens are included in the Agra nazúl and gardens fund, which receives a large subsidy from Government for the expenses of various gardens and buildings at Agra. The total receipts of the fund, exclusive of the Government grants, were Rs. 11,280, and the expenditure Rs. 20,332 as compared with Rs. 11,349 and Rs. 21,167 in the previous year

The gardens are not under the control of this Department, and no information of much interest for the purposes of this report has been received about them. An important change in the management has been the appointment of Mr. Westland, a trained gardener from England, as Superintendent. He joined his appointment on the 22nd October 1891.

51. **Date Palm Plantations.**—There is little that is new to record about the plantations at Lucknow and Saháranpur. The fruit fails to ripen owing to the dampness of the climate in the rainy season, and it was suggested last year that the experiment should be tried in the drier climate of the districts of Bundelkhand. Acting on this suggestion the District Officers of Jalaun, Bánda, Jhánsi, Hamírpur, and Agra have applied to the Superintendent, Botanical Gardens, Saháranpur, for date palm plants, and it is intended to supply them with both seedlings and imported offshoots. The results of the experiments made in these districts will be noted in future reports.

## SECTION VI.

### Introduction of Agricultural Improvements.

52. **Agricultural Shows.**—During the year under report agricultural shows were held in the districts of Bara Banki, Etáwah, Aligarh, Bulandshahr, Muzaffarnagar, Muttra, Meerut, Khairabad, Bánda, Basti and Benazír (Rámpur State). The fairs at Etáwah, Aligrah, Bulandshahr, Meerut and Benazír were visited by the Assistant Director personally and the rest by other officials of the Department, mostly apprentices from the Cawnpore Farm, in order to arrange for the exhibition of agricultural implements. The Assistant Director delivered lectures on agricultural subjects in most of the shows attended by him and assisted in awarding the prizes for cattle, agricultural produce and implements. An interesting and very popular feature of all these shows is a competition between the implements in ordinary use, and the improved but more expensive implements supplied by the Department. The Watts, Kaisar and Baldeo ploughs are shown in competition with native ploughs; the chain pump is worked against the ordinary swing basket, the chaff-cutter against labourers using the chopper and so on. Samples of produce of the Cawnpore and Cherat Farms, chiefly, Muzaffarnagar wheat, gur made from sorghum, and foreign varieties of cotton, were also exhibited in them; and prizes were given for the best samples of produce exhibited. A dairy in full working order was arranged under the management of Mr. Keventer at Rámpur, Aligarh and Meerut. The largest sale of ploughs and pumps took place at the Bulandshahr and Meerut shows.

As stated in previous reports, the agricultural exhibitions are becoming more and more popular every year, and in these the Department finds the best opportunity for bringing improved implements and methods into public notice.

53. **Distribution and sale of Implements.**—The following statement shows the distribution of implements for the year under report as compared with the previous year :—

| Serial number. | Name of implements. | In the year 1890-91. | | | | In the year 1891-92. | | | | More. | Less. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Sold. | Given on trial | Given on hire. | Total. | Sold. | Given on trial. | Given on hire. | Total. | | |
| 1 | Ploughs ... ... | 191 | 8 | 6 | 205 | 88 | 15 | 19 | 122 | ... | 83 |
| 2 | Chain-pumps ... ... | 16 | 11 | 8 | 35 | 17 | 12 | 13 | 42 | 7 | ... |
| 3 | Grain kibbling mills ... | 10 | ... | ... | 10 | 19 | ... | ... | 19 | 9 | ... |
| 4 | Chaff-cutter ... ... | 2 | ... | ... | 2 | 13 | ... | ... | 13 | 11 | ... |
| 5 | Flour mills ... ... | 2 | ... | ... | 2 | 1 | ... | ... | 1 | ... | 1 |
| 6 | Sugar pans ... ... | 1 | ... | 1 | 2 | ... | 1 | 1 | 2 | ... | ... |
| 7 | Dredgers ... ... | ... | 3 | 5 | 8 | ... | 6 | 4 | 10 | 2 | ... |
| 8 | Boring apparatus ... | ... | 6 | ... | 6 | ... | 6 | ... | 6 | ... | ... |
| 9 | American hoe ... .. | 1 | ... | ... | 1 | ... | ... | ... | ... | ... | 1 |
| 10 | Hay-straw Press ... | 1 | 1 | ... | 2 | ... | ... | ... | ... | ... | 2 |

The number of chain pumps sold has risen from 16 to 17. Many more pumps have been given on hire and trial than in the past year, and there is a very marked increase in the sale of grain-kibblers and chaff-cutters. These implements and others were taken to the numerous shows visited by the Assistant Director and exhibited there in working order in competition with country implements. They are simple in construction and effective in use; if the wages of labour continue to rise, the demand for such implements will probably increase.

An unusual number of ploughs were sold last year, and the supply of the small Watts plough, which is in especial demand, was exhausted. A fresh supply has now been made. The cheapness of these ploughs is appreciated by the cultivator; they cost only Rs. 2 each, but some difficulty has been experienced in keeping the price so low, and some delay in replenishing the stock this year was caused by the impossibility of obtaining them at this rate from the large factories such as the Barakar Iron Works. A local mistri had therefore to be employed.

54. The improved ploughs have now been thoroughly advertised over the Provinces; and in many districts the cultivators have an annual opportunity of buying them at the fairs.

To further facilitate the sale of the more expensive implements an attempt is being made to carry out the suggestion, made by the Government last year, to sell them on the hire-system, and rules have been framed for the purpose and circulated to persons interested. The price of the implements, under the hire-system, has been fixed only slightly higher than the cash price with a view to afford every encouragement to cultivators of average means. A few proprietors of private farms have also been asked to keep at their respective farms, as honorary agents of the Department, a number of pumps and ploughs each, and to sell them on the hire-system or to hire them to cultivators on their own responsibility. I apprehend, however, that except in the neighbourhood of the farm we should find difficulty in realising the hire, which becomes due quarterly: and I have some doubt as to the system being suitable for adoption in a Government Department, except on a very limited scale.

55. **Distribution of seed.**—The following is a statement showing the distribution of seed in the year under report as compared with the previous year:—

| Name of seed. | In 1890-91. | In 1891-92. | Difference. | | Remarks. |
|---|---|---|---|---|---|
| | | | More. | Less. | |
| | lbs. | lbs. | lbs. | lbs. | |
| Wheat ... ... ... ... | 25,871 | 26,975 | 1,104 | ... | |
| Barley ... ... ... ... | *Nil.* | 200 | 200 | ... | |
| Oats ... ... ... ... | 10,121 | 6,922 | ... | 3,199 | |
| Peas ... ... ... ... | *Nil.* | 58 | 58 | ... | |
| Sorghum ... ... ... ... | 379 | 484 | 105 | ... | |
| Nankin cotton ... ... ... | 17 | 7 | ... | 10 | |
| Guinea grass seed ... ... ... | 1 | 5 | 4 | ... | |
| Lucerne „ „ ... ... ... | 29 | 36 | 7 | ... | |
| Turnip ... ... ... ... | 1 | 1 | ... | ... | |
| Mangold ... ... ... ... | ... | 17 | 17 | ... | |

The demand for good wheat seed still continues to increase, and there is now a considerable demand for sorghum and oats. The decrease in the actual supply of Nankin cotton seed and of oats was not owing to diminished demand, but to there being an insufficient supply. The yield on the farm itself was small, and we were not successful in supplementing it from other sources. A larger quantity of oats is now being grown, and we should be better able to meet the demand another year.

56. **Agricultural Association.**—The time of the Director and Assistant Director was so fully taken up with inspection work in the cold weather that no general meeting of the Agricultural Association could be arranged. Two years ago a number of the members agreed to establish branch associations in various districts, and where a leading

zamíndár interests himself in the matter, the district societies continue to do good work by assisting in the distribution of selected varieties of seeds and of implements, by aiding the circulation of the *Agricultural Journal*, and by maintaining some interest in general agricultural questions. Reports have been received from the associations in the Allahabad, Agra, Bijnor and Budaun districts. Forecasts of the wheat, cotton, oilseed and indigo crops are regularly received from the members of the association and from other gentlemen who are good enough to take an interest in this work; and the leading members are consulted when agricultural matters are under the consideration of the Department. Their opinion was taken during the past year on the proposals that have again been brought forward for the establishment of fuel and fodder reserves, and on a question that was referred by the Government of India in regard to the exemption of manure from attachment or sale in execution of Civil Court decrees.

57. **The Agricultural Journal.**—In the review of last year's report the Government asked what steps were taken to diffuse the knowledge gained at the Experimental Farm. The answer is that in addition to placing any information available at the disposal of those who are sufficiently interested in agricultural matters to make special inquiry, the Department has for several years issued a vernacular journal in which accounts are given from time to time of the experiments carried on and their result. While a part of the paper is devoted to farm experiments, in another part translations are inserted of articles in English agricultural periodicals that seem likely to be of interest. The monthly circulation of the journal is now 393 copies, a slight increase since last year. Applications for back copies are also received occasionally. Some time ago inquiry was made for a Hindi edition, and if there were any widespread demand for copies in the Hindi character they would be printed; but when the experiment was made before it was found that the sale did not defray expenses. The journal appears to be appreciated, and I should be glad to see it used for the occasional interchange of views by members of the Agricultural Association or other persons of the farming class. I am afraid, however, that this can hardly be looked for at present; the classes who are interested in agriculture contain few persons in the habit of contributing to journals.

58. **Boring apparatus.**—The Department had the services of two well-sinkers at the beginning of the year, but one of them has lately been under suspension on suspicion of misconduct. They were paid by private individuals who employ them on the work of boring for the period of such employment, and the Department retains them when there is no private demand for their services. The amount contributed by private employers towards their wages for the year under report was Rs. 158-13-9 and that paid by the Department Rs. 26-7-9. The freight of boring tools is borne by the parties sending for and returning them, and the travelling expenses of well-sinkers are likewise met by them. The number of experimental borings performed during the year under report was 49. The districts where these were made are Bulandshahr, Jaunpur, Partábgarh and Etah. Applications for the services of the well-sinkers are frequently received; and as it appears that their work is appreciated, instruction in well-sinking has been extended to all the farm apprentices in order that they may be able to assist, if necessary, in boring operations. In future all persons employing the well-sinkers will be asked to inform the Department of the nature of the work done and the degree of success.

## SECTION VII.

### Registration of Traffic.

59. The following traffic was registered during the year 1891-92 :—

(1) Foreign traffic with Thibet and Nipal.

(2) Inland traffic of a portion of the province carried by road.

(3) Inter-provincial and internal traffic carried by rail.

60. **Foreign Traffic.**—The total value of the traffic which the provinces transacted with Thibet and Nipal during the year amounted to Rs. 1,10,02,257. The following table shows the total amount of imports and exports during 1891-92 and 1890-91; the

averages for 10 years 1881—91, with some detail of the principal articles interchanged, are also given :—

| | 1891-92. | 1890-91. | Average of 10 years 1881—91. |
|---|---|---|---|
| *Import from Thibet.* | | | |
| Total import ... Weight ... ... ... Mds. | 68,164 | 50,162 | 69,002 |
| Total import ... Value ... ... ... Rs. | 5,52,970 | 4,79,135 | 5,55,254 |
| Import of borax ... ... ... ... Mds. | 30,014 | 11,421 | 30,860 |
| Ditto salt ... ... ... ... „ | 31,656 | 28,772 | 33,300 |
| Ditto wool ... ... ... ... „ | 6,082 | 9,525 | 4,509 |
| *Import from Nipal.* | | | |
| Total import ... Weight ... ... ... Mds. | 27,73,306 | 24,14,028 | 31,85,983 |
| Total import ... Value ... ... ... Rs. | 64,34,052 | 59,22,255 | 64,34,282 |
| Import of grain ... ... ... ... Mds. | 8,92,940 | 12,91,618 | 12,20,730 |
| Ditto oil-seed ... ... ... ... „ | 1,41,800 | 1,09,494 | 2,00,242 |
| Ditto timber ... ... ... ... „ | 15,92,953 | 9,08,802 | 13,90,456 |
| Ditto firewood ... ... ... ... „ | 16,806 | 10,784 | 2,24,434 |
| Ditto drugs, gums and spices ... ... ... „ | 48,163 | 40,029 | 65,927 |
| *Export to Thibet.* | | | |
| Total export ... Weight ... ... ... Mds. | 50,879 | 39,953 | 63,965 |
| Total export ... Value ... ... ... Rs. | 2,67,719 | 1,90,244 | 2,66,460 |
| Export of grain ... ... ... ... Mds. | 43,594 | 35,519 | 57,315 |
| Ditto cotton goods ... ... ... ... „ | 783 | 261 | 472 |
| Ditto sugar ... ... ... ... „ | 1,554 | 1,961 | 4,462 |
| *Export to Nipal.* | | | |
| Total export ... Weight ... ... ... Mds. | 2,35,802 | 2,33,947 | 2,26,785 |
| Total export ... Value ... ... ... Rs. | 37,47,516 | 33,94,945 | 31,55,565 |
| Export of cotton goods ... ... ... ... Mds. | 35,351 | 31,538 | 31,994 |
| Ditto metals ... ... ... ... „ | 5,280 | 6,917 | 5,373 |
| Ditto salt ... ... ... ... „ | 60,501 | 58,084 | 57,013 |
| Ditto provision ... ... ... ... „ | 64,019 | 62,819 | 57,494 |
| Ditto sugar ... ... ... ... „ | 23,997 | 19,803 | 25,078 |

The traffic of the present year has been on the whole of an average type. The only items, fluctuations in which require notice, are wool, grain and timber. The import of wool, though considerably less than the import in the preceding year, is still much above the average. The decrease in the import of grain is due to a scarcity of food grains in Nipal, which led the Nipal Darbár to prohibit the export of rice grown in the Sub-Himalayan strip on the Nipalese border, the produce of which is usually imported freely into these provinces. The increase in the import of timber compared with 1890-91 is due to the fact that the trade in this article had not fully recovered last year from the effects of the restrictions which the Nipal Darbár considered it necessary to impose in 1889-90 on the sale of timber to secure the State from loss by fraud.

61. **Inland traffic.**—In the years 1877-78 and 1878-79 a cordon of posts was maintained all round the provincial boundaries of the North-Western Provinces and Oudh to ascertain the traffic transacted by road and river with the neighbouring British provinces and Native States. In 1879-80 the traffic carried by the Ganges and Jumna Canals and all the principal rivers of the province was registered. In the next three years the traffic of most of the metalled and a few of the unmetalled roads was registered,

chiefly in connection with proposals for the construction of new railways or metalled roads. From 1884 to 1890 the registering establishment was reduced owing to financial pressure and other causes, and the only road and river traffic that was registered by the Department was the foreign traffic with Thibet and Nipal, the traffic with Bengal by the rivers Ganges and Gogra, and the traffic of the Dún. The statistics collected from 1877 to 1883 gave information as to the trade which the province as a whole transacted at that time by road and river and of the amount of goods which passed on certain channels of communication; but the figures are now more or less obsolete; they are also to some extent incomplete. In 1891 steps were taken to bring the information for one part of the country up to date, and after consultation with District Officers registration was started on all the principal routes in the following eight districts which lie in the corner of the Gogra-Ganges doáb. This tract was chosen as its traffic had a special bearing on the proposed Lucknow-Rae Bareli-Jaunpur Railway.

| | | | |
|---|---|---|---|
| Rae Bareli. | Partábgarh. | Jaunpur. | Gházipur. |
| Sultánpur. | Fyzabad. | Azamgarh. | Ballia. |

62. The posts were located close to the boundary of each district, so as to exclude from registration as far as possible the local traffic of the districts. Trained muharrirs were employed at each post, and their work was inspected at unexpected intervals three times during the year by an inspector attached to the Department. Short distance traffic, *i.e.*, traffic which was confined within a circuit of 10 miles, was recorded separately from the traffic proceeding a longer distance. A classified list of articles was furnished to each registration clerk, and he was required to register the actual weight of all articles which sell by weight and the number and estimated weight of those which usually sell by number. The weight of the former class and the number of the latter class were as far as possible ascertained by him, by looking into the invoices which accompanied the goods, and in the absence of invoices recourse was made to a table of average weights carried by different means of conveyance supplied by the District Officer and to inquiries made from the cartman. The estimated weight of articles selling by number was chiefly based on the carrying capacity of the different means of conveyance.

63. The following table shows the total traffic of each district. The short distance traffic, *i.e.*, traffic which was confined within a circuit of 10 miles, is not included in the figures :—

| District. | Direction. | Cotton. | Cotton goods. | Grain. | Metals. | Oil-seeds. | Provisions. | Salt. | Sugar. | Wood. | Other articles which sell by weight. | Estimated weight of articles which sell by number. | Total. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Mds. | Mds. | Mds. | Mds | Mds. | Mds. | Mds. | Mds. | Mds. | Mds. | Mds. | Mds. |
| Rae Bareli. | Import | 3,659 | 8,634 | 23,722 | 6,486 | 12,582 | 7,455 | 38,510 | 71,687 | 7,637 | 48,461 | 1,394 | 2,30,227 |
| | Export | 5,427 | 1,796 | 2,88,349 | 1,505 | 70,030 | 25,909 | 6,979 | 4,610 | 11,886 | 55,862 | 3,801 | 4,76,154 |
| Partábgarh. | Import | 6,910 | 10,937 | 21,589 | 6,689 | 5,308 | 3,690 | 27,792 | 26,487 | 2,519 | 30,594 | 441 | 1,42,956 |
| | Export | 6,501 | 3,755 | 92,208 | 3,838 | 79,561 | 4,660 | 652 | 91,519 | 1,663 | 41,095 | 972 | 3,26,424 |
| Sultánpur. | Import | 8,608 | 14,221 | 59,370 | 10,747 | 14,400 | 17,916 | 73,248 | 29,464 | 24,417 | 91,185 | 1,842 | 3,45,418 |
| | Export | 398 | 1,942 | 99,265 | 5,797 | 58,677 | 15,679 | 31,682 | 1,08,374 | 22,559 | 71,834 | 4,381 | 4,20,588 |
| Fyzabad | Import | 2,823 | 2,920 | 250,591 | 2,819 | 31,400 | 56,526 | 7,091 | 3,08,827 | 116,626 | 1,75,510 | 13,935 | 9,69,068 |
| | Export | 22,861 | 6,833 | 56,365 | 7,779 | 5,673 | 43,517 | 106,897 | 78,227 | 38,753 | 84,331 | 867 | 4,52,103 |
| Jaunpur | Import | 21,874 | 3,097 | 1,97,012 | 15,668 | 71,761 | 3,923 | 1,102 | 2,71,444 | 117,383 | 90,130 | 4,085 | 7,97,479 |
| | Export | 21,840 | 8,250 | 70,642 | 14,909 | 11,080 | 3,301 | 53,407 | 4,54,955 | 11,583 | 77,040 | 3,488 | 7,30,495 |
| Azamgarh. | Import | 27,783 | 35,778 | 7,97,409 | 17.265 | 8,457 | 28,008 | 68,314 | 39,883 | 44,048 | 93,759 | 4,821 | 1 165,525 |
| | Export | 685 | 14,446 | 1,92,227 | 11,683 | 67,847 | 4,934 | 10,855 | 2.13,877 | 76,312 | 95,929 | 11,220 | 7,00,015 |
| Gházipur | Import | 607 | 11,284 | 4,72,617 | 5,465 | 16,185 | 3,828 | 39,420 | 1,09,208 | 14,480 | 79,402 | 11,863 | 7,64,359 |
| | Export | 5,862 | 38,712 | 1,36,049 | 7,679 | 123,921 | 3,491 | 13,227 | 34,241 | 12,199 | 1,15,172 | 6,037 | 4,96,590 |
| Ballia ... | Import | 2,648 | 4,895 | 23,340 | 2,118 | 4,004 | 244 | 1,446 | 2,133 | 334 | 7,498 | 624 | 49,284 |
| | Export | 320 | 689 | 80,581 | 903 | 10,418 | 1,614 | 4,084 | 47,212 | 1,604 | 25,832 | 3,428 | 1,76,685 |

64. **Rail-borne Traffic.**—The traffic carried by rail was registered on the block system described in previous reports. Returns were regularly received two months after the end of each quarter of the year from railway offices, showing the traffic transacted by the several internal blocks or registration divisions of the North-Western Provinces and Oudh with the seaport towns, other British provinces and the Native States of India, as well as the inter-divisional traffic. These have been published with a short review for the information of merchants and others interested in them.

The number of registration divisions in the North-Western Provinces and Oudh was during the year reduced from seven to six, as owing to the incorporation of the districts of Jalaun, Jhánsi, and Lalitpur in the Allahabad Division, the Jhánsi block was absorbed in the Allahabad block.

The Lucknow-Sitapur line was during the year extended from Golagokaran to Pilibhít to effect a junction with the Bareilly-Pilibhít line, and a branch of the Bengal North-Western Railway was opened from Gonda to Gogragháț. The stations on the former line from Seramau to Pilibhít were included in the Rohilkhand block, and the stations from Mailáni to Golagokaran in the Oudh block. The branch from Gonda to Gogragháț was included in the Oudh block.

65. The total traffic which these provinces transacted with the neighbouring British provinces, ports and Native States during the year amounted to 5,48,76,803 maunds, valued at Rs. 30,47,57,240, against 4,51,41,203 maunds, valued at Rs. 28,27,74,808 in the preceding year; the exports, amounting to 3,15,67,664 maunds and the imports to 2,33,09,139 maunds, the exports and imports in the previous year being 2,03,44,233 maunds and 2,47,96,970 maunds respectively. The increase in exports is principally accounted for by larger exports of wheat and other grains, linseed and sugar; the decrease in imports is entirely due to a smaller import of grain; all the other important articles of import showing considerable increase during the year :—

| *Imports.* | Mds. |
|---|---|
| Total decrease ... | ... 14,87,831 |
| Decrease in the import of grain | ... 44,11,111 |
| Increase in the import of cotton goods | 1,03,164 |
| Ditto ditto metals | ... 1,49,024 |
| Ditto ditto salt | ... 1,30,379 |
| Ditto ditto kerosine oil | ... 93,720 |
| Ditto ditto coal ... | ... 25,60,061 |

| *Exports.* | Mds. |
|---|---|
| Total increase ... | ... 1,12,23,431 |
| Increase in the export of wheat | ... 84,47,235 |
| Ditto other grains | ... 12,81,223 |
| Ditto linseed... | ... 10,42,260 |
| Ditto sugar ... | ... 5,16,197 |

66. The conditions of the two years were very dissimilar. The spring harvest of 1890 was poor, and the autumn harvest was exceptionally bad in many districts. The food stocks were greatly reduced, and during the latter part of 1890-91 prices had risen in consequence to a very high level, causing an extraordinary import of grain from the Panjáb, Rájputána and Behar, while the wheat trade of the province with the ports was unusually depressed. The spring harvest of 1891 proved very fair, and the area under cultivation was unusually large. The exhausted stocks were replenished, and the import of grain from outside, which was still being carried on vigorously in the first quarter of 1891-92, was gradually checked. On the other hand, bad harvests in Europe created a brisk demand for wheat at the Indian ports, and led to an exceptionally large export of wheat from these provinces. The autumn harvest, like the preceding spring harvest, was a good one, and prices, notwithstanding the large export of wheat, were generally lower in the third quarter of the present year than in the corresponding quarter of the preceding year. In the succeeding quarter they fell still further, and the prices of rice and millets in these two quarters were lower than in the adjoining province of the Panjáb and in the Rájputána States. The import of these grains was thus checked. The short crop of Russian linseed and the fall in the rate of exchange greatly stimulated the export of linseed from India, and during the year these provinces exported fully 50 per cent. more of this seed than in the preceding year. The effect of this large export of wheat and linseed was felt in the import of cotton goods, metals and other articles which these provinces receive from outside.

67. The traffic which the united provinces transacted by rail with each port, each British province and the Native States of Rájputána, Hyderabad and Mysore separately during the two years 1890-91 and 1891-92 is shown in the following table:—

| | Import into the North-Western Provinces and Oudh. | | | | Export from the North-Western Provinces and Oudh. | | | |
|---|---|---|---|---|---|---|---|---|
| | Weight. | | Value. | | Weight. | | Value. | |
| | 1890-91. | 1891-92. | 1890-91. | 1891-92. | 1890-91. | 1891-92. | 1890-91. | 1891-92. |
| *British Provinces, excluding chief seaport towns* | Mds. | Mds. | Rs. | Rs. | Mds. | Mds. | Rs. | Rs. |
| Madras ... ... | 1,107 | 1,095 | 26,361 | 25,978 | 16,035 | 25,182 | 3,08,132 | 4,34,902 |
| Bombay ... | 3,92,991 | 4,08,008 | 32,38,098 | 37,18,215 | 7,62,044 | 7,49,045 | 48,44,281 | 43,46,437 |
| Sindh ... ... | 821 | 1,612 | 9,376 | 19,776 | 2,14,092 | 2,19,073 | 11,30,423 | 11,87,613 |
| Bengal ... ... | 80,79,193 | 94,00,715 | 1,47,00,433 | 1,45,76,559 | 24,21,672 | 22,70,484 | 1,29,61,011 | 1,48,48,600 |
| Panjáb ... ... | 65,79,786 | 35,52,460 | 2,69,67,127 | 2,23,38,307 | 51,16,151 | 66,27,938 | 2,55,05,175 | 3,05,58,600 |
| Central Provinces ... | 5,59,112 | 8,18,751 | 28,18,271 | 43,16,386 | 7,21,389 | 9,30,633 | 45,95,361 | 51,07,090 |
| Berar ... ... | 34,994 | 38,029 | 5,97,450 | 6,02,113 | 1,43,297 | 1,24,912 | 12,65,185 | 11,15,088 |
| Total ... | 1,56,48,004 | 1,42,20,670 | 4,83,57,110 | 4,55,97,334 | 93,94,680 | 1,09,38,267 | 5,06,09,568 | 5,70,98,330 |
| *Native States.* | | | | | | | | |
| Rájputána and Central India. | 54,13,385 | 51,40,356 | 1,72,94,402 | 1,61,00,899 | 35,23,568 | 44,34,824 | 1,79,11,210 | 2,05,11,676 |
| Nizam's Territory ... | 354 | 179 | 4,024 | 2,567 | 5,064 | 5,010 | 1,16,822 | 1,96,861 |
| Mysore ... ... | 39 | 69 | 560 | 620 | 5,717 | 2,948 | 1,13,237 | 60,796 |
| Total ... | 54,13,778 | 51,40,604 | 1,72,98,986 | 1,61,04,086 | 35,34,349 | 44,42,782 | 1,81,41,269 | 2,07,69,333 |
| *Chief seaport towns.* | | | | | | | | |
| Madras ... ... | 833 | 1,075 | 20,532 | 26,842 | 37,540 | 41,421 | 7,05,177 | 8,43,026 |
| Bombay... ... | 6,83,088 | 6,57,232 | 1,24,45,285 | 1,25,69,524 | 17,35,157 | 59,98,352 | 1,65,36,647 | 2,32,58,088 |
| Karachi ... ... | 1,28,943 | 1,45,765 | 6,22,629 | 7,59,206 | 14,870 | 9,894 | 79,270 | 71,631 |
| Calcutta ... | 29,22,324 | 31,43,793 | 5,38,64,531 | 5,29,55,525 | 56,27,637 | 1,01,36,948 | 6,40,93,804 | 7,47,04,315 |
| | 37,35,188 | 39,47,865 | 6,69,52,977 | 6,63,11,097 | 74,15,204 | 1,61,86,615 | 8,14,14,898 | 9,88,77,060 |
| Total ... | 2,47,96,970 | 2,33,09,139 | 13,26,09,073 | 12,80,12,517 | 2,03,44,233 | 3,15,67,664 | 15,01,65,735 | 17,67,44,723 |

The statement shows what a large proportion of the trade of the province is transacted through or with Calcutta. During the year under report Calcutta took over 40 per cent. of the total exports of the provinces by rail, and supplied an equal percentage of the imports received by these provinces.

The trade with Bombay amounts to less than one-third of the trade with Calcutta. The exports of cotton and wheat are about equally distributed between the two ports, but the exports of linseed are almost wholly directed to Calcutta, Bombay drawing its supplies from the fields of the Central Provinces; and the exports of manufactured articles like indigo, shell-lac, saltpetre and opium are almost entirely in the hands of Calcutta merchants, who established a market for these articles long before the port of Bombay reached its present position in the trade with these provinces by the opening of the Bombay-Baroda and Central India and Indian Midland Railways. As a result of this, the import traffic in cotton goods and metals from Calcutta is much larger than from Bombay.

| | 1890-91. | | 1891-92. | |
|---|---|---|---|---|
| | Calcutta. | Bombay. | Calcutta. | Bombay. |
| *Export.* | Mds. | Mds. | Mds. | Mds. |
| Cotton ... ... ... | 4,36,262 | 620,971 | 2,01,025 | 1,74,382 |
| Wheat ... ... ... | 11,37,019 | 216,568 | 4,856,992 | 43,55,930 |
| Linseed... ... ... | 18,22,035 | 70,297 | 25,09,040 | 3,06,196 |
| Indigo ... ... ... | 28,703 | 58 | 3,0882 | 153 |
| Shell-lac ... ... | 87,277 | 178 | 1,00,065 | 13 |
| Saltpetre ... ... | 1,76,757 | 10,135 | 1,84,934 | 10,305 |
| Opium ... ... ... | 80,321 | ... | 68,038 | ... |
| *Import.* | | | | |
| Cotton goods ... ... | 5,39,178 | 1,41,147 | 6,14,590 | 1,39,054 |
| Metals ... ... ... | 6,91,355 | 1,93,171 | 7,73,186 | 1,92,229 |

The transactions of these provinces with the seaport towns of Madras and Karachi, with the Madras Presidency, Sindh, Berar and the Native States of Mysore and Hyderabad are very limited. The remaining blocks stand in the following order as regards their trade with these provinces:—

1. Panjáb.
2. Rájputána.
3. Bengal.
4. Central Provinces.
5. Bombay Presidency.

68. The exports from these provinces principally consist of cotton, wheat, oil-seeds, sugar, tea, hides and skin among the raw produce, and ghi (clarified butter), indigo, shell-lac, saltpetre among the manufactured articles; while the imports are principally made up of mineral products, such as coal, metals, salt and kerosine oil and manufactures of cotton and wool. There is some import of raw cotton, wool and stick-lac for factories which have been established in these provinces, and a small export of cotton and woollen goods and of metalwares manufactured in these provinces. There is also a large trade in coarse grains with the neighbouring provinces, the direction of which depends very much on the harvests in the different provinces. The aggregate value of the traffic in the articles already named during the year under report was 83 per cent. of the total trade, the remaining 17 per cent. being chiefly made up of railway materials, provisions and miscellaneous articles which are not registered in detail.

The following table compares the traffic in each of these articles in 1891-92 with their traffic in 1890-91 and the average of the preceding five years:—

| Articles. | 1891-92. | 1890-91. | Average, 1886—1891. |
|---|---|---|---|
| *Export.* | Mds. | Mds. | Mds. |
| Cotton | 4,71,122 | 12,14,234 | 13,94,939 |
| Wheat | 99,08,142 | 14,60,907 | 36,30,366 |
| Other grains | 31,99,710 | 19,18,487 | 26,89,261 |
| Oil-seeds | 50,04,735 | 34,12,239 | 46,92,418 |
| Sugar | 48,88,434 | 43,72,237 | 36,58,341 |
| Tea | 17,073 | 13,717 | 14,751 |
| Hides and skins | 2,70,818 | 2,46 445 | 2,60,905 |
| Ghí | 2,28,941 | 2,56,853 | 2,04,775 |
| Indigo | 44,857 | 33,389 | 43,263 |
| Sheli-lac | 1,00,573 | 88,219 | 89,042 |
| Saltpetre | 2,06,[illegible]2 | 1,95,637 | 1,85,310 |
| Opium | 72,161 | 81,282 | 85,557 |
| Cotton and woollen goods | 1,53,386 | 1,40.480 | 1,23,804 |
| Metals | 2,42,061 | 2,12,113 | 1,55,901 |
| *Import.* | | | |
| Cotton | 2,06,431 | 1,36,464 | 1,39,742 |
| Cotton goods | 9,33,936 | 8,30,772 | 8,40,102 |
| Wool | 25,110 | 15,005 | 15,606 |
| Woollen goods | 21,003 | 26,372 | 21,957 |
| Coal | 91,33,415 | 65,73,354 | 63,03,855 |
| Metals | 12,23,594 | 10,74,570 | 8,92,931 |
| Salt | 39,68,746 | 38,38,367 | 37,82,873 |
| Kerosine oil | 446,367 | 3,52,647 | 2,05,489 |
| Grain | 34,14,180 | 78,25,291 | 38,38,197 |
| Stick-lac | 1,60,900 | 1,15,461 | 1,32,278 |

The following figures show the value of traffic per head of population in the several divisions of the province during the present year, the calculation of value being confined to the articles mentioned in the last paragraph.

| *Division.* | *Value per head.* Rs. |
|---|---|
| Meerut | 10·8 |
| Rohilkhand | 6·9 |
| Agra | 9·3 |
| Allahabad | 17·3 |
| Benares and Gorakhpur | 4·6 |
| Oudh | 3·7 |

69. The most important feature of the present year's trade was the large export of wheat from these provinces to the ports. The wheat crop of 1891 in these provinces

was gathered on a much larger area than in any recent year, and its condition, though somewhat spoilt by the late winter rains, was on the whole very fair. On the other hand, there were unusually poor harvests in Europe. In England the seasons had been altogether unfavourable. The state of the crops in Southern Europe was worse still, while the failure of crops in Eastern Russia had assumed the form of a regular famine, and it was expected that the export of wheat from that country would be stopped. Prices consequently rose by nearly 6 shillings between the four months January to April, and in May there was a further rise of two shillings, bringing the price to over forty shillings a quarter—a rate which had not been reached in any month since the year 1884. The rise of price in Europe coupled with a fall of over one penny per rupee in exchange led to an unusually large export of Indian wheat to Europe in which these provinces had a large share.

The exports of wheat from these provinces during the present year are the largest on record; the only years the trade of which in any degree approaches the present year's traffic are 1883-84 and 1885-86, when 84,97,924 and 81,73,575 maunds were exported. More than 50 per cent. of the total exports were sent from the Meerut Division, 14 per cent. from Oudh, about 12 per cent. each from the Rohilkhand and Agra Divisions and 10 per cent. from the Allahabad Division.

The exports from Rohilkhand Oudh and Benares Division went almost wholly to Calcutta, those of Allahabad were equally divided between Calcutta and Bombay, while the greater portion of the export from the Meerut and Agra Divisions was directed to Bombay. Nearly 10 per cent. of the exports from Meerut were consigned to Delhi.

| | *Total exports.* | *Exports to Calcutta.* | *Exports to Bombay.* |
|---|---|---|---|
| | Mds. | Mds. | Mds. |
| Meerut ... ... ... | 50,13,164 | 15,71,823 | 29,33,448 |
| Agra ... ... ... | 11,35,506 | 2,27,629 | 8,66,841 |
| Allahabad ... ... ... | 9,68,682 | 4,42,523 | 4,63,675 |
| Rohilkhand ... ... ... | 11,91,693 | 10,85,880 | 64,004 |
| Oudh ... ... ... | 14,22,133 | 13,75770 | 27,958 |
| Benares ... ... ... | 1,76,964 | 1,53,367 | 4 |

The wheat trade increased to an extent that caused apprehension in some quarters of the possible effect of this drain on the food resources of the country. The statistics of the trade are however opposed to this view, showing as they do that the increased export of wheat was accompanied by a diminished import of other food grains.

## SECTION VIII.

### Promotion of Horse-breeding Operations through Civil Agency.

70. The establishment of the Civil Veterinary Department, the attention of which is to be given to the prevention of cattle disease and the promotion of veterinary education, as well as to the encouragement of horse-breeding, was carried out during the year, and on the 2nd of September 1892 Veterinary Captain Rayment was appointed Superintendent of the Department in these provinces. The Government of India have desired that information should be given in the Annual Report of this Department of the action taken towards carrying out suggestions made by that Government in May last for the extension and improvement of horse-breeding. The steps that should be taken have been discussed with the Superintendent of the Civil Veterinary Department. He has been empowered to entertain a few trained *salutris* as a beginning and has been asked to draw up proposals for the establishment of a Veterinary School at Cawnpore, where it is intended to give practical training sufficient to qualify the students for employment as *salutris* in districts. The Chairmen of District Boards were communicated with by Government with a view to ascertaining whether the Boards would undertake the management of stallions supplied by Government, and the Board of Revenue made similar inquiries as to the assistance that might be expected from large landowners or Courts of Wards. Subsequently the Government made a grant of Rs. 7,000 for the purchase of stallions in the present financial year, but the expenditure of this

sum and the arrangements for distributing the animals do not belong to the period now under report. At the suggestion of the Government of India it has also been decided that patwáris shall keep up a register of mares, a commencement being made in those districts in which horse-breeding operations are now being carried on.

71. The reports of the Superintendent of the Civil Veterinary Department for the past year are addressed to the Inspector-General of the Department. It appears from Veterinary Captain Rayment's report on what is known as the military section of his work that the tracts in these provinces in which horse-breeding is most successfully carried on are the four southern districts of the Meerut Division—Aligarh, Bulandshahr, Meerut and Muzaffarnagar—and some parts of Saháranpur. In the Bareilly Division a beginning has been made in Bijnor, Moradabad, Shábjahánpur and Budaun, but these as well as Agra and Muttra are described as only moderately good from the horse-breeding stand-point. The statistics given in the report include some districts in the Panjáb, and do not show separately the number of studs in these provinces. It would appear however that 188 stallions have been supplied by the Imperial Government, including 36 thorough-breds, 77 Norfolk trotters, and 61 Arabs.

In the Revenue Section of his report Veterinary Captain Rayment has little to say about these provinces. Only in Cawnpore and Etáwah have stallions other than those purchased by the Imperial Government as yet been located. The experiments made by the Department in fodder cultivation at Babugarh have been very successful, and a class is now held there twice a year for the instruction of zamíndárs, Courts of Wards' managers and others. Hitherto the pupils have come chiefly from the Panjáb, where horse-breeding operations are more extensively carried on than in these provinces.

## SECTION IX.

### Miscellaneous.

72. **Aligarh dairy.**—The establishment of a dairy at Cherat under the management of Mr. Keventer, a Swedish dairy expert, was alluded to in last year's report, and an account of its working up to the end of March last was given in a special report, which was made public. It is unnecessary therefore to describe the results of the experiment in much detail. Mr. Keventer began work in August 1891, and for a few months he had not very much to do. The assembling of the cavalry camp at Aligarh first brought him custom on a large scale, and the demand for dairy produce then increased very rapidly. In October only 18lbs. of butter were sold; in the following months the sales were :—

| | lbs. |
|---|---|
| November ... ... ... ... ... ... | 201 |
| December ... ... ... ... ... ... | 345 |
| January ... ... ... ... ... ... | 839 |
| February ... ... ... ... ... ... | 869 |
| March ... ... ... ... ... ... | 940 |

With the beginning of the hot weather the sales fell off in April to 780lbs. and in May to 545. Some customers were too far off; others had gone to the hills. Arrangements were subsequently made with Messrs. Murray & Co. for the sale of butter at Naini Tal at a price sufficiently high to free the dairy from any suspicion of interfering with private enterprise, which has already established one dairy in that neighbourhood. In consequence of these arrangements the sales increased—

| | lbs. |
|---|---|
| In June to ... ... ... ... ... ... | 742 |
| „ July „ ... ... ... ... ... ... | 760 |
| „ August „ ... ... ... ... ... ... | 934 |
| „ September „ ... ... ... ... ... ... | 898 |

73. The principal object of keeping the dairy in full working order during the hot weather months was to ascertain with what success the difficulties of making and transporting butter at that season could be overcome. There is no ice manufactory at Aligarh, and the distance of the dairy from the railway station was found very incon-

venient as the weather got warmer. For a time a bungalow in Aligarh was hired, but this arrangement also did not work well; and when the rains began the manager went back to the farm. The expense of ice and of boxes in which to pack the butter in ice was considerable, and the weight of the boxes added considerably to the railway charges. During the latter part of the season butter was sent to Naini Tal without ice; it was found that if made up at once on arrival it remained perfectly good. In the plains butter was sent regularly as far as Meerut and Lucknow, and I have heard no complaints of the condition in which it arrived. The Rohilkhand and Kumaun Railway authorities were good enough to arrange for the rapid despatch of parcels sent to Naini Tal; without this assistance the butter could scarcely have arrived in good condition.

The ready sale of the butter shows that the arrangements made were satisfactory; and it has been shown that even in the hot weather butter can be transported long distances. The expense however was considerable; and it was found very difficult to work at a profit.

74. The manufacture of cheese was carried on when there was a sufficient supply of milk after the demand for butter had been met. Some samples of the cheese were very promising, but Mr. Keventer's opinion that Indian cheese is inferior in flavour to the imported article is evidently shared by the public; and he has not sold a very large quantity. The opening of a dairy at Lucknow may assist in getting the surplus stock disposed of. The manufacture of *ghi, khoa, khir*, and such articles was not financially successful.

75. The statement given in Appendix K contains statistics as to the working of the dairy. The profit on the 12 months' working is put at Rs. 2,030 if Mr. Keventer's pay be excluded from the charges. This is a calculated profit, as the accounts cannot be altogether kept distinct from those of the *úsar* reserve.

If dairies can be worked profitably the advantage to the European community, especially in the large stations, will be very great; and advantage has been taken of the extension of Mr. Keventer's service to April next to arrange for opening a dairy at Lucknow. I understand that private dairies are likely to be opened at Delhi and Gwalior by persons who visited Cherat to learn the work; and in several military stations dairies are now working successfully. Mr. Keventer worked dairies at several shows, and he has visited a considerable number of stations to give advice either as to the starting of dairies or working of dairy machinery.

76. **The Lucknow Museum.**—During the year under report the total number of additions made to the collection of specimens amounted to 4,739, of which 458 specimens were obtained by purchase; 1,916 were collected by the museum employés; and 2,365 were presented to the museum. The most valuable and interesting of the new specimens were perhaps those added in the Archæological Department as the result of Dr. Führer's excavations at Rámnagar in the Bareilly district. The number of visitors was 176,126 against 170,055 in the previous year; and the daily average of visitors rose from 465 in 1890-91 to 482 in the year under report. The largest attendance was 9,972 on the 15th November 1891, a Hindu bathing day. The increase of visitors is partly due to the large number of sight-seers attracted by the exceptionally high floods of the Gumti from the 4th to the 8th October 1891. The practice of setting aside one day a month for *parda-nashín* ladies was continued with success; the attendance on these days having risen from 645 in 1890-91 to 676 in the year under report. A collection of specimens of the artistic metal-wares of the province for the Imperial Institute, London, was made under the direction of the Committee, and a representative collection of artwares for the Raipur Museum in the Central Provinces was commenced. The work which the Committee undertook of preparing sets of plaster casts of architectural ornaments and mural decorations from the buildings at Fatehpur-Sikri for foreign museums, proved to be on a larger scale than was expected. It is hoped that during the coming year the various sets of casts that have been applied for will be furnished. The expenditure on the museum amounted to Rs. 12,144 against Rs. 13,379

in the preceding year. The receipts, including municipal contributions, were Rs. 1,770 as compared with Rs. 1,921 in the year before.

77. **Opening of an Agricultural School.**—The proposal of the Technical Education Committee that an Agricultural School should be opened in connection with the Farm at Cawnpore received the approval of the Government during the year under report. A plan for a school building has been passed, and after some correspondence with the Principals of the Saidapet and Poona Colleges, a Head Master has been obtained from the Madras Presidency, who, after passing through the College at Saidapet, has for some years been employed as an Agricultural Inspector, and is well recommended by the Principal of the College and by Mr. Benson. It is hoped that the school will be opened on a regular footing in June 1893.

78. **Scarcity in Kumaun and Garhwal.**—In April owing to a threatened scarcity in the hill districts of Kumaun and Garhwál I was asked to arrange for the purchase and import of grain, to Haldwáni, Rámnagar and Kotdwára. At first it was thought that a supply of 17,000 maunds would be sufficient, but subsequently orders for the purchase of an additional stock of 11,000 maunds were received. The arrangements for the purchase and delivery to the Tahsíldárs of Najíbabad and Moradabad of the grain occupied the greater part of my time for some weeks in April and May, and subsequently in July, I was deputed to Lobha to make some inquiries as to the extent of the distress in that part of Garhwál.

79. **Emigration of Cultivators to the Central Provinces.**—Reference has been made in the two last annual reports to proposals for the location of cultivators from the thickly peopled tracts of these provinces in the sparsely populated wastes of the Central Provinces. After considerable discussion the project ended in the acceptance by Saiyid Muhammad Mir and other gentlemen of Meerut of a lease for six villages in the Charwa tract in the Hoshangabad district on terms agreed to by the Chief Commissioner. From a report made by the lessees regarding their progress during the 13 months ending the 31st March 1892, it appears that they commenced operations on the 15th February 1891 and they took altogether 219 emigrants from time to time from these provinces to their grants. The first three months were spent in making houses and arranging for the accommodation of the immigrants. In June and July about 200 acres of land were broken up and planted for the kharíf harvest, but in the following months the settlement was severely tried by the climate; some of the settlers died, many deserted, and those who remained were insufficient to watch the crops. The management was also unfortunate, and one manager after another was tried without much success. Much damage was caused by fires; the most disastrous of which was on the 27th of March 1892. The results of the first year's operations have thus been most unfortunate for the lessees, who appear to be convinced of the hopelessness of their venture as a colonisation scheme, and have attemped unsuccessfully to obtain more liberal terms in the matter of employing local instead of imported labour. The colonists apparently find more profitable employment elsewhere in the neighbourhood than in the grant villages; and desert not to return to the North-Western Provinces, but to seek services in the towns of the Central Provinces. The experience of the lessees in this matter is not singular, and does not in any way prove that the Indian peasant is unfit for colonisation in favourable circumstances. It should be noted that the Charwa scheme was left entirely to private enterprise, and that the terms on which leases would be given and the difficulties with which lessees were likely to be confronted were made perfectly clear before the operations commenced.

80. **Specification of Inventions.**—Twelve cases were received during the year from the Government of India for report.

81. **General.**—When the year under report opened Mir Muhammad Husain, M.R.A.C., the Assistant Director, was acting for Mr. Holderness, who on his return from leave relieved him on the 14th December 1891. Mr. Holderness held the charge of the Department until the 26th of March 1892 when I relieved him. During the cold weather

Mr. Holderness examined the districts of Bánda, Hamírpur and Bara Banki for settlement purposes, and submitted the usual reports regarding them. During a part of April and May and again in July I was engaged on work connected with the scarcity in the hills; in August the usual Kanúngo Examinations were held; and some of the districts in the Benares Division where a new form of khewat is being prepared were visited.

Saiyid Muhammad Hadi, a graduate of the Royal Agricultural College at Cirencester, joined the Department as Assistant Director on the 19th of September 1891, and was on tour during the greater part of the cold weather. He was unfortunately obliged by ill-health to take leave in the beginning of May 1892, and, except for a few days in July, was absent during the remainder of the year under report,—a serious loss to the Department.

An unusual amount of work has fallen to the share of Babu Lachman Parshad, B.A., the Personal Assistant, as for some time he was in charge of the duties of the Assistant Director in addition to his own, which are sufficiently onerous. He has performed all the work entrusted to him with unusual intelligence and industry, and I am much indebted to him for the assistance which his thorough knowledge of the work of the Department enabled him to give me.

I have the honor to be,

SIR,

Your most obedient servant,

J. O. MILLER,

*Director.*

# APPENDICES.

# APPENDIX A.

*Memorandum showing the expenditure and receipts of the Department of Land Records and Agriculture, North-Western Provinces and Oudh, for the financial year of* 1891-92.

| Heads of charges. | Budgeted allotment. | Actual expenditure. | Saving on budgeted expenditure. | Receipts paid into Treasury. | Remarks. |
|---|---|---|---|---|---|
| | Rs. a. p. | Rs. a. p. | Rs. a. p. | Rs. a. p. | |
| Office establishment ... ... ... ... | 24,468 0 0 | 24,453 11 5 | 14 4 7 | ... | |
| Do. contingencies ... ... ... ... | (a)6,748 5 3 | 6,743 9 0 | 4 12 3 | ... | (a) Budget grant for 1891-92 was Rs. 6,688: Rs. 60-5-3 were subsequently allowed by G. O. No. $\frac{4946}{X.-B.-110}$, dated 26th August 1892. |
| Do. Travelling allowance ... ... ... | 2,500 0 0 | (b) 2,334 12 1 | 165 3 11 | ... | (b) Including Rs. 1,000 transferred to the head "Travelling Allowance of Gazetted Officers" by G. O. No $\frac{1212}{X.-B.-29}$, dated 29th February 1892. |
| Gházipur Tobacco Farm ... ... ... | (c)8,200 0 0 | 8,199 1 2 | 0 14 10 | 3,352 6 6 | (c) Including Rs. 1,200 transferred from 'Well fund' by G.O. No. $\frac{6638}{X.-B.-569}$, dated 25th November 1891, and Rs. 4,000 sanctioned in G. O. No. $\frac{6979}{X.-B.-669}$, dated 10th December 1891. |
| Traffic registration ... ... ... ... | 19,000 0 0 | 18,185 7 10 | 814 8 2 | ... | |
| Cawnpore experimental station contingencies ... ... | 9,332 0 0 | 9,332 0 0 | *Nil.* | 3,664 3 8 | |
| Ditto establishment ... | 4,068 0 0 | 3,803 12 0 | 264 4 0 | ... | |
| Ditto workshop ... | 5,500 0 0 | 5,500 0 0 | *Nil.* | 2,272 9 0 | |
| Tea shops ... ... ... ... ... | 300 0 0 | ... | 300 0 0 | ... | |
| Well experimental fund ... ... ... | (d) 300 0 0 | 265 7 6 | 34 8 6 | ... | (d) Excluding Rs. 1,200 transferred to the head "Gházipur Tobacco Farm." |
| Usar fund ... ... ... ... ... | 7,000 0 0 | 7,000 0 0 | ... | 2,505 12 5 | |
| Miscellaneous ... ... ... ... | ... | ... | ... | 286 10 9 | |

Certified that the receipts in this office were checked in the manner prescribed in G. O. Circular No. 34, dated 5th October 1882.

J. O. MILLER,
*Director.*

APPEN

*Statement showing Arboricultural Receipts*

| District. | Receipts. | | | | | | Total. |
|---|---|---|---|---|---|---|---|
| | 1886-87. | 1887-88. | 1888-89. | 1889-90. | 1890-91. | 1891-92. | |
| | Rs. | Rs. | Rs. | Rs. | Rs. | Rs. | Rs. |
| Dehra Dún ... ... ... | ... | 33 | 5 | ... | 102 | 11 | 151 |
| Saháranpur ... ... ... | 914 | 787 | 3,111 | 968 | 974 | 1,309 | 8,063 |
| Muzaffarnagar ... ... ... | 3,280 | 3,456 | 5,107 | 3,258 | 6,773 | 4,235 | 26,109 |
| Meerut ... ... ... | 4,622 | 3,089 | 3,363 | 3,963 | 7,809 | 1,840 | 24,686 |
| Bulandshahr ... ... ... | 4,362 | 1,306 | 2,842 | 4,530 | 3,065 | 3,032 | 19,137 |
| Aligarh ... ... ... | 2,822 | 824 | 1,091 | 1,413 | 2,637 | 1,153 | 9,940 |
| Total ... | 16,000 | 9,495 | 15,519 | 14,132 | 21,360 | 11,580 | 88,086 |
| Muttra ... ... ... | 550 | 455 | 957 | 1,222 | 638 | 1,641 | 5,463 |
| Agra ... ... ... | 1,283 | 1,001 | 1,476 | 1,885 | 1,591 | 1,278 | 8,514 |
| Farukhabad ... ... ... | 212 | 669 | 426 | 1,019 | 498 | 731 | 3,555 |
| Mainpuri ... ... ... | 1,551 | 619 | 814 | 1,189 | 1,225 | 1,255 | 6,653 |
| Etáwah ... ... ... | 193 | 394 | 155 | 292 | 80 | 500 | 1,614 |
| Etah ... ... .. | 610 | 638 | 762 | 782 | 720 | 826 | 4,338 |
| Total ... | 4,399 | 3,776 | 4,590 | 6,389 | 4,752 | 6,231 | 30,137 |
| Bareilly ... ... ... | 944 | 403 | 1,465 | 1,019 | 956 | 1,236 | 6,023 |
| Bijnor ... ... ... | 837 | 924 | 1,836 | 1,705 | 1,931 | 1,599 | 8,832 |
| Budaun ... ... ... | 815 | 612 | 924 | 686 | 765 | 715 | 4,517 |
| Moradabad ... ... ... | 840 | 1,545 | 3,961 | 2,726 | 1,713 | 1,620 | 12,405 |
| Sháhjahánpur ... ... ... | 434 | 288 | 1,150 | 610 | 270 | 545 | 3,297 |
| Pilibhít ... ... ... | 536 | 760 | 790 | 856 | 972 | 1,017 | 4,931 |
| Total ... | 4,406 | 4,532 | 10,126 | 7,602 | 6,607 | 6,732 | 40,005 |
| Cawnpore ... ... ... | 1,895 | 1,301 | 2,056 | 1,828 | 4,297 | 1,252 | 12,629 |
| Fatehpur ... ... ... | 461 | 804 | 524 | 387 | 811 | 658 | 3,645 |
| Bánda ... ... ... | 426 | 301 | 638 | 334 | 246 | 246 | 2,191 |
| Hamírpur ... ... ... | 551 | 277 | 321 | 262 | 340 | 503 | 2,254 |
| Allahabad ... ... ... | 768 | 533 | 941 | 618 | 1,455 | 476 | 4,791 |
| Jhánsi ... ... ... | 654 | 468 | 536 | 593 | 1,448 | 535 | 4,234 |
| Jalaun ... ... ... | 162 | 449 | 276 | 281 | 214 | 278 | 1,660 |
| Total ... | 4,917 | 4,133 | 5,292 | 4,303 | 8,811 | 3,948 | 31,404 |
| Benares ... ... ... | 2,370 | 1,120 | 1,014 | 1,924 | 2,940 | 751 | 10,119 |
| Mirzapur ... ... ... | 517 | 313 | 864 | 514 | 601 | 167 | 2,976 |
| Jaunpur ... ... ... | 1,414 | 4,079 | 2,929 | 2,736 | 1,051 | 1,780 | 13,989 |
| Gházipur ... ... ... | 146 | 280 | 443 | 552 | 682 | 408 | 2,511 |
| Ballia ... ... ... | 30 | 47 | 48 | 66 | 96 | 49 | 336 |
| Total ... | 4,477 | 5,839 | 5,298 | 5,792 | 5,370 | 3,155 | 29,931 |
| Gorakhpur ... ... ... | 100 | 146 | 113 | 544 | 765 | 525 | 2,193 |
| Basti ... ... ... | 84 | 81 | 272 | 282 | 197 | 95 | 1,011 |
| Azamgarh ... ... ... | 1,397 | 822 | 754 | 636 | 591 | 529 | 4,729 |
| Total ... | 1,581 | 1,049 | 1,139 | 1,462 | 1,553 | 1,149 | 7,933 |
| Almorah ... ... ... | ... | ... | ... | ... | 2 | ... | 2 |
| Garhwál ... ... ... | ... | ... | ... | ... | 120 | 181 | 301 |
| Naini Tal ... ... ... | ... | ... | ... | ... | ... | ... | ... |
| Total ... | ... | ... | ... | ... | 122 | 181 | 303 |
| Lucknow ... ... ... | 531 | 547 | 740 | 741 | 804 | 686 | 4,049 |
| Unao ... ... ... | 220 | 347 | 666 | 210 | 206 | 326 | 1,975 |
| Rae Bareli ... ... ... | 150 | 104 | 120 | 54 | 164 | 112 | 704 |
| Sitapur ... ... ... | 117 | 103 | 163 | 313 | 433 | 573 | 1,702 |
| Hardoi ... ... ... | 227 | 89 | 232 | 1,448 | 239 | 262 | 2,497 |
| Kheri ... ... ... | 14 | 48 | 52 | 18 | 31 | 30 | 193 |
| Total ... | 1,259 | 1,238 | 1,973 | 2,784 | 1,877 | 1,989 | 11,120 |
| Fyzabad ... ... ... | 538 | 1,355 | 849 | 594 | 599 | 286 | 4,221 |
| Gonda ... ... ... | 487 | 59 | 232 | 354 | 210 | 270 | 1,612 |
| Bahraich ... ... ... | 87 | 114 | 164 | 673 | 431 | 390 | 1,859 |
| Sultánpur ... ... ... | 249 | 615 | 392 | 473 | 468 | 629 | 2,826 |
| Partabgarh ... ... ... | 430 | 502 | 882 | 616 | 276 | 286 | 2,992 |
| Bara Banki ... ... ... | 191 | 183 | 528 | 1,286 | 1,127 | 1,523 | 4,838 |
| Total ... | 1,982 | 2,828 | 3,047 | 3,996 | 3,111 | 3,384 | 18,348 |
| GRAND TOTAL ... | 39,021 | 32,890 | 46,984 | 46,460 | 53,563 | 38,349 | 2,57,267 |
| Lucknow Exotic Plantation .. ... | ... | ... | 43 | ... | 77 | ... | 120 |
| Ditto Date ,, ... ... | ... | ... | 36 | ... | 500 | ... | 536 |
| Agra Exotic Plantation ... ... | ... | ... | ... | ... | 380 | ... | 380 |
| Cawnpore Farm and Headquarters, &c. ... | ... | ... | ... | ... | 397 | ... | 397 |
| Total ... | ... | ... | 79 | ... | 1,354 | ... | 1,433 |
| GRAND TOTAL ... | 39,021 | 32,890 | 47,063 | 46,460 | 54,917 | 38,349 | 2,58,700 |

DIX B.

*and Charges from* 1886-87 *to* 1891-92.

| Charges. | | | | | | Total. | Average receipts per year. | Average expenditure per year. |
|---|---|---|---|---|---|---|---|---|
| 1886-87. | 1887-88. | 1888-89. | 1889-90. | 1890-91. | 1891-92. | | | |
| Rs. | Rs. | Rs. | Rs. | Rs. | Rs. | Rs. | Rs. | Rs. |
| 550 | 400 | 400 | 448 | 497 | 363 | 2,658 | 25 | 443 |
| 1,846 | 1,739 | 1,797 | 2,100 | 1,902 | 1,929 | 11,313 | 1,344 | 1,886 |
| 3,547 | 3,338 | 2,863 | 3,528 | 3,306 | 3,466 | 20,048 | 4,352 | 3,341 |
| 1,700 | 1,884 | 1,891 | 2,029 | 1,916 | 1,726 | 11,146 | 4,114 | 1,858 |
| 2,481 | 5,000 | 2,100 | 3,642 | 3,641 | 3,090 | 19,864 | 3,189 | 3,311 |
| 3,455 | 3,374 | 2,400 | 2,738 | 2,800 | 2,582 | 17,349 | 1,657 | 2,891 |
| 13,579 | 15,735 | 11,451 | 14,485 | 14,062 | 13,066 | 82,378 | 14,681 | 13,730 |
| 2,002 | 2,000 | 2,545 | 1,980 | 1,597 | 2,000 | 12,124 | 910 | 2,021 |
| 2,543 | 3,317 | 2,572 | 2,792 | 3,042 | 3,400 | 17,666 | 1,419 | 2,944 |
| 1,350 | 1,159 | 1,800 | 1,798 | 1,799 | 1,796 | 9,702 | 593 | 1,617 |
| 1,300 | 1,196 | 1,300 | 1,219 | 1,070 | 1,300 | 7,385 | 1,109 | 1,231 |
| 905 | 1,358 | 1,086 | 1,396 | 1,137 | 1,071 | 6,953 | 269 | 1,159 |
| 1,513 | 1,395 | 1,200 | 1,195 | 1,200 | 1,399 | 7,902 | 723 | 1,317 |
| 9,613 | 10,425 | 10,503 | 10,380 | 9,845 | 10,966 | 61,732 | 5,023 | 10,289 |
| 2,506 | 2,487 | 2,376 | 2,393 | 2,397 | 2,242 | 14,401 | 1,004 | 2,400 |
| 900 | 800 | 861 | 892 | 899 | 900 | 5,252 | 1,472 | 875 |
| 1,263 | 811 | 1,300 | 1,124 | 1,300 | 1,500 | 7,298 | 753 | 1,216 |
| 1,600 | 2,047 | 2,100 | 1,600 | 1,599 | 1,386 | 10,332 | 2,068 | 1,722 |
| 1,497 | 1,238 | 1,197 | 1,173 | 1,765 | 1,660 | 8,530 | 549 | 1,422 |
| 100 | 187 | 283 | 470 | 621 | 736 | 2,397 | 822 | 400 |
| 7,866 | 7,570 | 8,117 | 7,652 | 8,581 | 8,424 | 48,210 | 6,668 | 8,035 |
| 1,789 | 1,990 | 1,798 | 1,799 | 2,213 | 2,015 | 11,604 | 2,105 | 1,934 |
| 1,215 | 1,433 | 1,300 | 1,400 | 1,460 | 1,396 | 8,204 | 607 | 1,367 |
| 2,348 | 3,577 | 2,758 | 2,493 | 2,850 | 2,975 | 17,001 | 365 | 2,833 |
| 1,101 | 1,800 | 1,498 | 1,476 | 1,709 | 1,541 | 9,125 | 376 | 1,521 |
| 1,580 | 1,831 | 1,768 | 1,593 | 1,382 | 1,774 | 9,928 | 798 | 1,655 |
| 7,337 | 7,100 | 6,800 | 7,500 | 7,039 | 6,192 | 41,968 | 706 | 6,995 |
| 2,282 | 2,200 | 1,997 | 2,100 | 2,100 | 2,100 | 12,779 | 277 | 2,130 |
| 17,652 | 19,931 | 17,919 | 18,361 | 18,753 | 17,993 | 1,10,609 | 5,234 | 18,435 |
| 1,000 | 981 | 942 | 997 | 1,000 | 1,500 | 6,420 | 1,687 | 1,070 |
| 1,899 | 1,375 | 1,254 | 1,036 | 1,498 | 1,400 | 8,462 | 496 | 1,410 |
| 2,211 | 2,010 | 2,098 | 2,292 | 2,085 | 2,200 | 12,896 | 2,331 | 2,149 |
| 500 | 600 | 727 | 850 | 990 | 898 | 4,565 | 419 | 761 |
| 459 | 500 | 500 | 500 | 355 | 452 | 2,766 | 56 | 461 |
| 6,069 | 5,466 | 5,521 | 5,675 | 5,928 | 6,450 | 35,109 | 4,989 | 5,851 |
| 857 | 1,199 | 1,343 | 1,400 | 1,380 | 1,457 | 7,636 | 365 | 1,273 |
| 319 | 400 | 312 | 500 | 700 | 693 | 2,924 | 169 | 487 |
| 800 | 800 | 800 | 800 | 800 | 796 | 4,796 | 788 | 799 |
| 1,976 | 2,399 | 2,455 | 2,700 | 2,880 | 2,946 | 15,356 | 1,322 | 2,559 |
| 250 | 250 | 250 | 267 | 300 | 300 | 1,617 | ... | 270 |
| 313 | 450 | 598 | 799 | 797 | 800 | 3,757 | 50 | 626 |
| ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 563 | 700 | 848 | 1,066 | 1,097 | 1,100 | 5,374 | 50 | 896 |
| 1,456 | 1,510 | 1,464 | 1,808 | 1,446 | 1,643 | 9,327 | 675 | 1,554 |
| 360 | 346 | 404 | 494 | 439 | 452 | 2,495 | 329 | 416 |
| 545 | 565 | 978 | 845 | 654 | 1,100 | 4,687 | 117 | 781 |
| 936 | 857 | 932 | 989 | 947 | 985 | 5,646 | 284 | 941 |
| 677 | 1,128 | 1,240 | 1,355 | 1,649 | 1,574 | 7,623 | 416 | 1,271 |
| 122 | 144 | 194 | 300 | 300 | 300 | 1,360 | 32 | 227 |
| 4,096 | 4,550 | 5,212 | 5,791 | 5,435 | 6,054 | 31,138 | 1,853 | 5,190 |
| 381 | 556 | 767 | 712 | 584 | 973 | 3,973 | 704 | 662 |
| 849 | 500 | 629 | 594 | 548 | 241 | 3,361 | 269 | 560 |
| 702 | 889 | 890 | 900 | 845 | 899 | 5,125 | 309 | 854 |
| 700 | 600 | 700 | 899 | 900 | 1,050 | 4,849 | 471 | 808 |
| 769 | 630 | 576 | 600 | 600 | 800 | 3,975 | 499 | 663 |
| 996 | 1,000 | 1,000 | 1,500 | 1,320 | 1,500 | 7,316 | 806 | 1,219 |
| 4,397 | 4,175 | 4,562 | 5,205 | 4,797 | 5,463 | 28,599 | 3,058 | 4,766 |
| 65,811 | 70,951 | 66,588 | 71,315 | 71,378 | 72,462 | 4,18,505 | 42,878 | 69,751 |
| 677 | 573 | 73 | 73 | ... | 77 | 223 | 20 | 37 |
| | | 495 | 436 | ... | 600 | 2,781 | 89 | 464 |
| ... | 400 | 400 | ... | ... | 400 | 1,200 | 63 | 200 |
| 400 | 250 | 350 | 548 | ... | 780 | 2,328 | 66 | 388 |
| 1,077 | 1,223 | 1,318 | 1,057 | ... | 1,857 | 6,532 | 238 | 1,089 |
| 66,888 | 72,174 | 67,906 | 72,372 | 71,378 | 74,319 | 4,25,037 | 43,116 | 70,840 |

# APPENDIX C.

| District. | Serial number of plots. | Situation of plot. | Area in acres. | Date of commencement of treatment. | Method of treatment. | Result of inspection by Director, Botanical Department, 1891-92. |
|---|---|---|---|---|---|---|
| Cawnpore ... | 1 | Juhi, on an *úsar* plain 5 miles from Cawnpore. | 102·25 | July 1882 ... | A.—*Preservation and extension of natural grasses.*—The plot has been enclosed partly by wire-fence and partly by a ditch. A small portion is measured off into squares, and the improvement of the grasses and the diminution of the *reh*-infected spots are periodcally observed by Mr. Duthie. In the remaining area grass seeds have occasionally been sown broadcast. In 1890 the grazing was sold after the rains. In 1891 grass was cut and made into hay in October, but it proved to be of poor quality, and the hay-making was therefore not tried in 1892. The character of the grasses has undoubtedly improved by enclosure to a large extent, but some inferior grasses still continue to prevail. | The Juhi reserve near Cawnpore was visited in January. There is a greater variety of grasses here than at Aligarh, the predominate kind being *Chloris tetrastachya*, a species apparently confined to saline soils. The condition of the grasses within the experimental plots were carefully observed; and the measurements of grass patches and bare patches then made, compared with previous records, show on the whole that the grass vegetation is gradually encroaching over the bare places. |
| | | | | | B.—*Plantation of fuel and fodder trees.*—A large number of babúl (*Acacia arabica*), dhák (*Butea frondosa*), ber (*Zizyphus*), nim (*Melia Indica*), shisham (*Dalbergia sissu*), siras (*albizzialebleck*), pipal (*Ficus religiosa*), gular (*Ficus glomerata*), bargad (*Ficus Indica*), and other hardy indigenous trees, as well as a number of exotic plants such as salt-bush, sheep-bush, rain-trec, &c., have been planted from time to time after the following methods:—<br>(1) On slightly elevated spots where grass of a superior kind exists, and the soil has not been washed away by erosion.<br>(2) On sides of mounds artificially raised, which offer protection to the plants, when very young, from hot winds, seeds being planted on the sheltered sides of the mound.<br>(3) In pits of the following description:—<br>(*a*) dug five feet deep, lined with Willesden rot-proof paper, and filled with good soil from cultivated land;<br>(*b*) dug to the same depth, but refilled with the same soil and without any lining. | The gradual extension year by year of the grass vegetation within these reserves, besides constituting valuable sources of fodder locally, may also be viewed as an important step towards reclamation; for it is well known that vegetation prevents the accumulation of *reh* salts from the sub-soil, until the surface soil becomes gradually fitted for cultivation. It is therefore advisable to encourage as far as possible the extended growth of the natural vegetation by reserving the seed of selected plants for sowing every year on the more exposed portions of the ground.<br>Arrangements are being made for sowing a certain number of common grasses, such as anjan, makra, janewar, palwan and tikrya, in equal sized plots in order to test their behaviour under various treatments in relation to irrigation and manure.<br>The experiments hitherto made with exotic plants have not been successful. A large quantity of the seed of *jáit* (*Sebania aegyptiaca*), a quick-growing, hardy tree, was sown during last rainy season in each of the reserves, but the seedlings nearly all died owing to excess of rain. Another trial will be made by sowing the seed at a different time of the year. |
| | | | | | C.—To the worst piece of *úsar* that could be selected gypsum and farmyard manure were applied in 1884. It was sown in 1885 with rice, but the crop failed. However in the following year the land yielded a crop of rice which, though not up to an average in quality, was well matured and had plump grain. | |
| | 2 | Amramau, on an *úsar* plain 5 miles from Cawnpore. | ... | Ditto .. | Most of the land has been brought under the plough by means of embankments and manure, and now bears fair rice and cold weather crops. | |
| | | | | | This plain has been divided in two parts one of which is worked as a combined arable and cattle farm. The following experiments are conducted in the other part. A nursery is maintained to grow both indigenous and exotic plants, planted out where soil is suitable. The whole is protected against cattle by a fencing of barbed wire:— | The changes which have taken place during the past year within the experimental plots at the Cherat reserve, compared with previous records, continue to show improvement. The bare patches are becoming reduced, and *dúb* and other good fodder grasses are extending. |

| | | | | | | |
|---|---|---|---|---|---|---|
| Aligarh ... | 3 | Cherat, a plain 5 miles from Aligarh. | 242 | August 1885. | (1) Fuel and fodder trees are planted. Babúl (Acacia Arabica), shisham (Dalbergia sissu) siras (albizzialebleck) nim (Melia Indica), and jait were chiefly sown and planted. No trees except babúl could be propagated by seed sowing, all other seeds either refused to grow or the seedlings withered away. The seed grown plants succumbed especially to the frost of 1888. The planted trees grew up to a height of 4 or 5 feet in three or four years when most of them were hopelessly damaged, partly by the frost and partly by their roots striking into the Kakar bed, 1¼ feet thick, lying at a depth of 2 feet 3 inches from the surface. No manures were applied to the trees, but they were regularly irrigated during the winter and summer months of each year. There are at present 180 date palm trees which were planted in July 1890. These are making very fair but the usual slow progress. The particular plot occupied by them happens to be free from salts and therefore favourable to their growth.<br>(2) Natural grasses are preserved and allowed to spread undisturbed. Originally this plot was infested with *reh*. By keeping off the cattle the úsar grass (sporobolus) first found a footing on the land and since 1888 good grasses, *e. g.*, *chloris tetrastachya châkeri* (an aquatic grass), "*motha*," "*basaunta*," '*jánewa*' *Andropogon Annulutus* '*butt*' "*Hari dub*," "*anjana*,"† *Elensine argypteaca* "*gandhal*," "*sewai*" "*makoi*" *Peninsetum cenchroides*,‡ &c., have been establishing themselves and the plot is now covered with these; the úsar grass giving way to better grasses every year.<br>(3) Exotic grasses are sown, *môsêl*, *chloris terastachya*, teff grass and "*rena*" were sown from time to time. The two first grasses are now abundant others have grown only here and there.<br>(4) Once a plot of about 25 acres used to be flushed with canal water with a view to raising meadow grasses. The experiment was continued for two years during which period improvement in the growth of úsar grasses (sporobolus) was noticed, but as the supply of water was too deficient in 1888, the experiment was stopped and the plot has since been devoted to the cultivation of grasses of which chloris tetrastachya grows most luxuriantly.<br>(5) An embankment about 4 feet in height and 8 feet in breadth has been raised round a piece of low land measuring about 15 acres in order to retain storm water and to see whether the land can thus be rendered fit for rice cultivation. In course of the last six years, success has been attained so far that the efflorescence of *reh* has totally disappeared and the texture of the soil considerably improved and some grasses especially relished by cattle notably "*butt*" and *nári* have commenced to grow more or less luxuriantly and the area is covered with green herbage from July to December when the grasses naturally dry up having shed their seeds which grow next year and add to the luxuriance of the succeeding crop. Although no attempt has yet been made to take a crop of rice, yet our experience of similar lands elsewhere and the present condition of the improved soil of the plot, render it almost certain that a fair crop of rice may be raised on it.<br>(6) The surface of a plot measuring 25 acres and yielding an efflorescence of *reh* was annually scraped to test the rate and rapidity of formation of the efflorescence. The effect of scraping on the efflorescence of the salts having proved unsatisfactory, a ditch was dug round the plot towards the end of 1888, and an enclosure about 1 foot in height was raised in order to allow rain water to accumulate and be absorbed by the land, so that the salts may sink down. The efflorescence has stopped since 1890, the surface soil has become firm and *butt* grass begun to appear in the ditch, but natural grasses have not yet established themselves on the surface of the plot. The growth however of "*butt*" grass is increasing, and it is hoped that the whole plot will be covered by that grass in course of two or three years. | The úsar grass suffers periodically on being submerged after long continued heavy rain. On a portion of the reserve which is for several months annually under water the vegetation is composed for the most part of sedges and semi-aquatic grasses, one of which (Diplachne fasca) is much relished by buffaloes. The seed of this grass should therefore be reserved for sowing on these permanently inundated spots.<br>Date-palm cultivation promises to be successful in this reserve. |

## APPENDIX C.

| District. | Serial number of plots. | Situation of plot. | Area in acres. | Date of commencement of treatment. | Method of treatment. | Result of inspection by Director, Botanical Department, 1891-92. |
|---|---|---|---|---|---|---|
| Aligarh ... | 4 | Gursíkran a plain 7 miles from Aligarh. | 960 | August 1885. | This plain is treated much like Juhi. It has been protected from cattle by a ditch, and the grass allowed to grow and cover the plain. A nursery is maintained to grow both indigenous and exotic plants, which are planted out where soil is tolerably good. The object in the case of this plain is to ascertain whether by excluding cattle for a number of years, the natural grasses have any chance of obtaining a permanent footing, and to find out which trees do best on a tolerably good class of *úsar* land. | The Cavalry Camp of Exercise was being held close to Aligarh at the time, and there was consequently a large demand for grass fodder which was scarce generally during the cold weather months in Upper India. The advantages of maintaining grass reserves as sources for emergent supplies of fodder were clearly shown on this particular occasion. From the Gúrsíkran reserve several hundreds of maunds must have been removed, the greater portion being composed of the coarse-looking *khar-úsara* grass (*sporobolus pallidus*), the prevalent species in that reserve. The grass was taken without permission by the regimental grass-cutters, the overseer being unable with his small staff of men to prevent them. Little harm, however, would have been done had the overseer been able to direct his special attention to the protection of the small portion of ground containing the experimental plots, from which much of the grass was rooted up. Consequently no reliable records could be made in regard to the changes undergone by the vegetation on these plots during the past year. A large quantity of the *úsar* grass had been cut early in the season and stacked as hay. The whole of this was taken away to the Cavalry Camp and given to the horses as fodder.<br>About 160 seedling date palms are alive, but they are not doing as well as those planted at Cherat. |

# APPENDIX D.

*Statement showing expenditure incurred on account of reclamation of Amramau Usar, from* 1885-86 *to* 1891-92.

| Years. | Purchase of land. | Compensation for trees. | Fencing. | | | | Pay of supervisor. | Pay of chaukidar. | Wages of ploughmen and other labour connected with farming. | Planting trees. | Manure. | Seed. | Irrigation. | Purchase of live-stock. | Feed of live-stock. | Labour attending on live-stock and selling milk. | Purchase of dead-stock, one cart, one pair of buffaloes, buffaloes sold for Rs 22. | Building. | Repair of building. | Well. | Surveying and mapping usar land. | Price of implements and their repairs. | Miscellaneous, such as hemp, oil, baskets, &c. | Total. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Digging trench. | Stone and iron posts. | Wire. | Labour of fixing posts and stretching wire. | | | | | | | | | | | | | | | | | | |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 |
| | | | Rs. a. p. | | | | Rs. a. p. | | Rs. a. p. | | Rs. a. p. | Rs. a. p. | Rs. a. p. | Rs. a. p. | Rs. a. p. | Rs. a. p. | Rs. a. p. | Rs. a. p. | Rs. a. p. | Rs. a. p. | | Rs. a. p. | Rs. a. p. | Rs. a. p. |
| 1885-86 ... | ... | .. | 16 11 6 | ... | ... | ... | 261 0 0 | ... | 147 12 3 | ... | 20 0 0 | 30 11 6 | ... | 402 7 6 | 32 8 9 | 52 13 0 | 65 0 0 | 461 6 9 | 33 8 0 | 9 3 3 | ... | 6 3 6 | 0 11 6 | 1,540 1 6 |
| 1886 87 ... | ... | .. | ... | ... | ... | ... | 240 0 0 | ... | 232 1 9 | ... | ... | 22 11 3 | ... | 411 2 6 | 129 11 0 | 142 14 3 | ... | ... | ... | 21 10 3 | ... | 32 2 3 | 3 5 3 | 1,235 10 6 |
| 1887-88 ... | ... | ... | ... | ... | ... | ... | 240 0 0 | ... | 190 3 9 | ... | ... | 157 0 0 | ... | 1,155 9 3 | 234 10 3 | 205 9 9 | ... | 352 5 9 | 35 9 0 | 115 2 9 | ... | 5 9 0 | 11 14 6 | 2,703 10 0 |
| 1888-89 ... | ... | ... | ... | ... | ... | ... | 240 0 0 | ... | 201 1 6 | ... | ... | 54 13 0 | ... | 78 0 0 | 278 9 9 | 216 1 0 | ... | 46 11 6 | 38 8 0 | 82 1 9 | ... | 1 10 3 | 27 7 0 | 1,264 15 9 |
| 1889-90 ... | ... | ... | ... | ... | ... | ... | 256 12 10 | ... | 215 3 9 | ... | ... | 18 15 0 | 10 0 6 | 77 0 0 | 158 13 0 | 265 5 6 | ... | ... | 20 1 6 | ... | ... | ... | 21 3 3 | 1,043 7 4 |
| 1890-91 ... | ... | ... | 65 8 0 | ... | ... | ... | 83 3 7 | ... | 192 9 3 | ... | ... | 10 12 0 | 6 8 6 | ... | 186 1 3 | 272 1 6 | ... | ... | 9 0 0 | 10 0 0 | ... | 6 4 3 | 11 4 9 | 853 5 1 |
| 1891-92 ... | ... | ... | ... | ... | ... | ... | 149 0 0 | ... | 185 4 0 | ... | ... | 5 14 3 | 52 11 0 | 82 0 0 | 71 8 9 | 100 7 0 | ... | ... | ... | ... | ... | 19 1 9 | 10 7 0 | 676 5 9 |
| Total ... | .. | .. | 82 3 6 | ... | ... | ... | 1,470 0 5 | ... | 1,364 4 3 | ... | 20 0 0 | 300 13 0 | 69 4 0 | 2,206 3 3 | 1,091 14 9 | 1,255 4 0 | 65 0 0 | 860 8 0 | 136 10 6 | 238 2 0 | ... | 70 15 0 | 86 5 3 | 9,317 7 11 |

| | | | |
|---|---|---|---|
| *Deduct*—Half of total pay of supervisor* | ... | 735 | 0 2 |
| | | 8,582 | 7 9 |
| *Add*—Rs. 58 compensation for land | ... | 58 | 0 0 |
| Total | ... | 8,640 | 7 9 |

* Juhi another usar plain was also under the supervision of the same man.

S. M. HADI,
*Assistant Director.*

## APPENDIX E.

*Amramau Usar receipts up to 30th September 1892.*

| Year. | Sale of grain produced. | Sale of old babúl trees. | Rent. | Milk. | Sale of live-stock. | Sale of wool. | Miscellaneous, such as sale of kankar, hire of cart. | Total. |
|---|---|---|---|---|---|---|---|---|
| | Rs. a. p. | Rs. a. p. | Rs. a. p. | Rs. a. p. | Rs. a. p. | Rs. a. p. | Rs. a. p. | Rs. a. p. |
| 1885-86 ... | 67 3 0 | ... | ... | 112 0 0 | ... | ... | 8 10 6 | 187 13 6 |
| 1886-87 ... | 131 8 0 | ... | ... | 214 1 9 | 31 10 0 | 16 8 0 | 10 8 0 | 404 3 9 |
| 1887-88 ... | 95 12 0 | ... | 28 8 0 | 120 0 6 | 608 12 9 | 39 10 6 | 4 8 0 | 897 3 9 |
| 1888-89 ... | 242 13 0 | ... | 106 3 6 | 337 15 0 | 711 4 9 | 50 2 9 | 45 14 3 | 1,494 4 9 |
| 1889-90 ... | 68 1 6 | 55 0 0 | 132 0 0 | 340 9 0 | 252 12 0 | ... | 10 0 0 | 858 66 |
| 1890-91 ... | 89 5 9 | ... | 198 0 0 | 447 2 6 | 281 12 9 | 12 11 6 | ... | 1,029 0 6 |
| 1891-92 ... | 144 9 3 | ... | 117 14 0 | 44 12 3 | 348 5 9 | 23 6 0 | ... | 678 15 3 |
| Total ... | 839 4 6 | 55 0 0 | 582 9 0 | 1,616 9 0 | 2,234 10 0 | 142 6 9 | 79 8 9 | 5,550 0 0 |

S. M. HADI,
*Assistant Director.*

# APPENDIX F.

*Statement showing the Receipts and Expenditure of the Cherat Úsar, Aligarh, till 30th September 1892.*

| Expenditure. | Expenditure from 1885 to September 1891. | Expenditure from October 1891 to September 1892. | Total. |
|---|---|---|---|
| *Reclamation of Úsar.* | Rs. a. p. | Rs. a. p. | Rs. a. p. |
| Compensation of land ... ... ... | 687 8 11 | ... | 687 8 11 |
| Excavation of boundary ditch ... ... ... | 129 5 0 | ... | 129 5 0 |
| Fencing ... ... ... ... | 1,019 5 0 | ... | 1,019 5 0 |
| Making embankment ... ... ... | 11 1 6 | ... | 11 1 6 |
| Digging tank ... ... ... ... | 201 11 0 | ... | 201 11 0 |
| Breaking land, ploughing and sowing field ... | 139 15 0 | ... | 139 15 0 |
| Preparing nursery and planting trees ... ... | 19 4 6 | ... | 19 4 6 |
| Making drains and irrigation charges ... ... | 167 11 0 | ... | 167 11 0 |
| Removing *reh* and sundries ... ... ... | 40 12 9 | ... | 40 12 9 |
| Planting date palms and rain trees, &c. ... ... | 145 14 11 | ... | 145 14 11 |
| Cutting experimental grass ... ... ... | 21 1 0 | 5 0 9 | 26 1 9 |
| Purchase and repairs of tools ... ... ... | 60 2 3 | ... | 60 2 3 |
| Building servants' quarters ... ... ... | 108 11 11 | ... | 108 11 11 |
| Ditto well ... ... ... | 282 14 3 | 30 0 6 | 312 14 9 |
| Sowing grass ... ... ... ... | 10 9 0 | ... | 10 9 0 |
| Total ... | 3,046 0 0 | 35 1 3 | 3,081 1 3 |
| *Establishment.* | | | |
| Supervisors ... ... ... ... | ... | ... | ... |
| Chaukidárs, mális, &c. ... ... ... | 1,327 7 10 | 127 9 0 | 1,455 0 10 |
| Contingencies ... ... ... ... | 161 2 9 | 57 15 6 | 219 2 3 |
| Total ... | 1,488 10 7 | 185 8 6 | 1,674 3 1 |
| *Milking Stock.* | | | |
| Purchase of cows ... ... ... ... | 1,159 0 0 | 216 0 0 | 1,375 0 0 |
| Ditto of bull ... ... ... ... | 65 7 0 | ... | 65 7 0 |
| Feed of cattle ... ... ... ... | 2,400 12 8 | 2,143 11 9 | 4,544 8 5 |
| Wages of attendants ... ... ... | 371 5 0 | 354 10 10 | 725 15 10 |
| Construction of sheds ... ... ... | 2,462 2 3 | 378 4 0 | 2,840 6 3 |
| Contingencies ... ... ... ... | 139 4 6 | 64 1 9 | 203 6 3 |
| Purchase of milk ... ... ... ... | 38 14 0 | ... | 38 14 0 |
| Total ... | 6,636 13 5 | 3,156 12 4 | 9,793 9 9 |
| *Cultivation.* | | | |
| Live-stock—Buffaloes ... ... ... | 137 5 0 | 6 15 0 | 144 4 0 |
| Dead-stock—tools and plants ... ... ... | 53 7 3 | 12 13 3 | 66 4 6 |
| Seed ... ... ... ... ... | 63 3 3 | 69 10 0 | 132 13 3 |
| Irrigation ... ... ... ... | 83 10 0 | 85 9 4 | 169 3 4 |
| Manure ... ... ... ... | 13 0 0 | 4 8 0 | 17 8 0 |
| Labour ... ... ... ... | 232 0 0 | 308 6 0 | 540 6 0 |
| Miscellaneous ... ... ... ... | ... | 15 2 9 | 15 2 9 |
| Total ... | 582 9 6 | 503 0 4 | 1,085 9 10 |
| GRAND TOTAL ... | 11,754 1 6 | 3,880 6 5 | 15,634 7 11 |

| Receipt. | Receipts from 1885 to September 1891. | Receipts from October 1891 to September 1892. | Total. |
|---|---|---|---|
| *Reclamation of Úsar.* | Rs. a. p. | Rs. a. p. | Rs. a. p. |
| Rent of land ... ... ... ... | 375 11 6 | ... | 375 11 6 |
| Irrigation receipts ... ... ... ... | 61 10 7 | ... | 61 10 7 |
| Sale-proceeds of púlâs ... ... ... | 13 7 0 | ... | 13 7 0 |
| Miscellaneous ... ... ... ... | ... | 5 0 0 | 5 0 0 |
| Total ... | 450 13 1 | 5 0 0 | 455 13 1 |
| *Dairy Experiment.* | | | |
| Sale of milk, &c. ... ... ... ... | 1,145 6 9 | 1,169 5 9 | 2,314 12 6 |
| Sale of cattle and skin ... ... ... | 91 9 0 | 583 12 0 | 675 5 0 |
| Total ... | 1,236 15 9 | 1,753 1 9 | 2,990 1 6 |
| *Cultivation.* | | | |
| Sale of grain ... ... ... ... | 191 2 0 | 265 14 6 | 457 0 6 |
| GRAND TOTAL ... | 1,878 14 10 | 2,024 0 3 | 3,902 15 1 |

S. M. HADI,
*Asstt. Director.*

# APPENDIX G.

*Valuation Statement of Cherat Úsar on 30th September* 1892.

| Number. | Particulars. | Amount. | Total. | Remarks. |
|---|---|---|---|---|
| | | Rs. a. p. | Rs. a. p. | |
| | Building— | | | |
| 1 | (1) Servant's quarters, valuation calculated by a deduction of 10 per cent. per annum (for six years) from the original cost Rs. 108-11-11. | 43 8 0 | ... | |
| | (2) Shed for cattle, valuation calculated by deduction of 10 per cent. per annum (for two years) from the original cost Rs. 2,840-6-0. | 2,272 4 10 | 2,315 12 10 | |
| 2 | Fencing— | | | |
| | Valuation calculated by deduction of 5 per cent. per annum for (five years) from the original cost Rs. 1,019-5-0. | 764 7 8 | 764 7 8 | |
| 3 | 2 wells (masonry) valued at the original cost ... ... | 312 14 9 | 312 14 9 | |
| 4 | Implements— | | | |
| | *Agricultural.* | | | |
| | 5 country ploughs with yokes at Rs. 2-8-0 each ... | 12 8 0 | ... | |
| | 5 Watts' ploughs at Rs. 7 each ... ... ... | 35 0 0 | ... | |
| | 11 spades at annas 12 each ... ... ... | 8 4 0 | ... | |
| | 2 axes ... ... ... ... | 1 4 0 | ... | |
| | 3 hasias at annas 2 each ... ... ... | 0 6 0 | ... | |
| | 3 khurpas at annas 2 each ... ... ... | 0 6 0 | ... | |
| | 1 bullock-cart ... ... ... ... | 20 0 0 | ... | |
| | 2 purs (leather buckets and ropes) at Rs. 2-8-0 each ... | 5 0 0 | ... | |
| | 4 kudáls at annas 10 each ... ... ... | 2 8 0 | ... | |
| | *Milking.* | | | |
| | 1 karahi (pan) ... ... ... ... | 2 0 0 | ... | |
| | 3 lotas (jugs) and 3 glass ... ... ... | 2 4 0 | ... | |
| | 6 kalsas (pitchers) at Rs. 2-8-0 each ... ... | 15 0 0 | 104 8 0 | |
| 5 | Produce :— | | | |
| | Rice, *saundi* 69 maunds at 24 seers the rupee ... | 115 0 0 | ... | |
| | „ 7 „ syamjira at 20 seers the rupee ... | 14 11 0 | ... | |
| | „ 4 „ 29 seers narangi at 16 seers the rupee... | 11 13 0 | ... | |
| | „ 8 „ 5 „ of hiranj at 16 seers the rupee | 20 5 0 | ... | |
| | „ 22 „ 30 „ sátha at 28 seers the rupee ... | 32 8 0 | ... | |
| | Wheat, 15 maunds 10 seers at 16 seers the rupee ... | 38 2 0 | ... | |
| | Barley, 31 maunds at 25 seers the rupee ... ... | 49 12 0 | ... | |
| | Peas, 7 maunds at 20 seers the rupee ... ... | 14 0 0 | ... | |
| | Fodder, 2,004 maunds at 5 maunds the rupee ... | 400 12 0 | ... | |
| | Rice straw, 500 maunds at 5 maunds per rupee ... | 100 0 0 | 796 15 0 | |
| | Carried over ... | ... | 4,294 10 3 | |

| Number. | Particulars. | Amount. | Total. | Remarks. |
|---|---|---|---|---|
| | | Rs. a. p. | Rs. a. p. | |
| | Brought forward ... | ... | 4,294 10 3 | |
| 6 | Cattle— | | | |
| | Buffaloes ... ... ... ... | 750 0 0 | ... | |
| | Cows ... ... ... ... ... | 620 0 0 | ... | |
| | Calves ... ... ... ... ... | 272 0 0 | ... | |
| | Heifers ... ... ... ... ... | 104 0 0 | ... | |
| | Buffalo heifers ... ... ... ... | 40 0 0 | ... | |
| | „ calves ... ... ... ... | 10 0 0 | ... | |
| | Bull ... ... ... ... ... | 300 0 0 | ... | |
| | Buffalo bull ... ... ... ... | 30 0 0 | ... | |
| | For plough ... { Buffalo ... ... ... | 126 0 0 | ... | |
| | { Oxen ... ... ... | 110 0 0 | 2,362 0 0 | |
| 7 | Manure— | | | |
| | 5,000 maunds at Rs. 2-8-0 per 100 maunds ... ... | 125 0 0 | 125 0 0 | |
| 8 | Trees— | | | |
| | Miscellaneous, 397, at 8 annas each on average ... | 198 8 0 | ... | |
| | Date palms, 180, three years old, at Rs. 1-4-0 each ... | 225 0 0 | 423 8 0 | |
| 9 | Two guns ... ... ... ... ... | 20 0 0 | 20 0 0 | |
| 10 | Furniture and miscellaneous articles such as grain-bags, lantern, &c., estimated value only. | 15 0 0 | 15 0 0 | |
| 11 | Land. Reclaimed— | | | |
| | (*a*) 21¼ acres rented at Rs. 8 per acre valued at Rs. 72 per acre, (*b*) 21¾ acres land of the same quality under direct management valued at Rs. 72 per acre. | 3,096 0 0 | ... | |
| | Thirty-three acres broken this year lying fallow still 2nd class land valued at Rs. 48 per acre. | 1,584 0 0 | ... | |
| | (*c*) Old cultivated area 3¾ acres valued at Rs. 100 the acre. | 375 0 0 | ... | |
| | Úsar, 162¼ acres, at Rs. 5 per acre ... ... | 811 4 0 | 5,866 4 0 | |
| | Total ... | ... | 13,106 6 3 | |

S. M. HADI,
*Assistant Director.*

# APPENDIX H.

*Statement showing the Receipts and Expenditure of Gursikran Usar till the 30th September 1892.*

| Number. | Expenditure. Heads. | From 1885 to September 1891. | From October 1891 to 30th September 1892. | Total. | Remarks. | Number. | Receipts. Heads. | From 1885 to September 1891. | From October 1891 to 30th September 1892. | Total. | Remarks. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Rs. a. p. | Rs. a. p. | Rs. a. p. | | | | Rs. a. p. | Rs. a. p. | Rs. a. p. | |
| | Compensation of land ... ... ... | 1,440 12 0 | ... | 1,440 12 0 | | I | Grain ... ... | 192 9 9 | ... | 192 9 9 | |
| | Excavation of boundary ditch ... ... | 251 15 0 | ... | 251 15 0 | | | | | | | |
| | Plantation of trees ... ... ... | 121 12 5 | ... | 121 12 5 | | | | | | | |
| | Cultivation ... (1) Cattle. Purchase of— ... | ... | 89 8 0 | 89 8 0 | | II | Grass and pula ... | 852 6 9 | 191 5 0 | 1,043 11 9 | |
| | (2) Feed of cattle ... | 39 2 0 | 5 0 0 | 44 2 0 | | | | | | | |
| | (3) Seed ... ... | 275 8 8 | 22 14 0 | 298 6 8 | | | | | | | |
| | (4) Implements ... ... | 118 13 0 | 25 6 0 | 144 3 0 | | | | | | | |
| | (5) Irrigation ... ... | 544 12 8 | ... | 544 12 8 | | III | Rent of land ... | 1,046 2 2 | 365 4 9 | 1,411 6 11 | |
| | (6) Drains ... ... | 351 1 5 | 53 6 0 | 404 7 5 | | | | | | | |
| | (7) Labour ... ... | 59 12 9 | 8 0 9 | 67 13 6 | | | | | | | |
| | Grass ... (1) Cutting grass ... | 290 14 0 | 48 4 6 | 339 2 6 | | | | | | | |
| | (2) Experiments ... | 2 0 0 | 3 1 0 | 5 1 0 | | IV | Irrigation recoveries ... | 397 13 6 | 112 7 3 | 510 4 9 | |
| | Building ... (1) Servants' quarters ... | 80 6 0 | 244 9 0 | 324 15 0 | | | | | | | |
| | (2) Well ... ... | 26 4 0 | ... | 26 4 0 | | | | | | | |
| | (3) Cattle shed ... ... | 3 4 0 | ... | 3 4 0 | | | | | | | |
| | Establishment ... (1) Pay of supervisor ... | 624 5 4 | 201 0 0 | 825 5 4 | | V | Miscellaneous ... | 44 3 0 | 1 0 0 | 45 3 0 | |
| | (2) „ „ chaukidárs, &c. ... | 1,618 3 8 | 311 6 0 | 1,929 9 8 | | | | | | | |
| | Contingencies ... ... ... | 88 14 9 | 34 13 0 | 123 11 9 | | | | | | | |
| | Total ... | 5,937 13 8 | 1,047 4 3 | 6,985 1 11 | | | Total ... | 2,533 3 2 | 670 1 0 | 3,203 4 2 | |

S. M. HADI,
*Asstt. Director.*

# APPENDIX K.

*Statement showing the receipt and expenditure of Cherat dairy during the year ending 30th September 1892.*

| Expenditure. | Amount. | Total. | Receipt. | Amount. | Total. |
|---|---|---|---|---|---|
| | Rs. a. p. | Rs. a. p. | | Rs. a. p. | Rs. a. p. |
| To price of milk 2,061 maunds, 38 seers, 6 chittacks ... ... | 4,263 4 9 | ... | By sale of butter ... ... ... ... ... | 7,005 7 4 | ... |
| „ „ „ ice, salt, oil for separator ... ... ... | 279 2 0 | ... | „ cream ... ... ... ... ... | 2 14 0 | ... |
| „ salt, separator oil, colouring substance ... ... ... | 166 12 3 | 4,709 3 0 | „ cream cheese ... ... ... ... ... | 37 1 0 | ... |
| „ purchase of vessels for keeping milk, &c. ... ... ... | 85 13 6 | ... | „ whole milk cheese ... ... ... ... | 279 4 0 | 7,324 10 4 |
| „ labour ... ... ... ... ... ... | 541 1 0 | ... | „ separated milk cheese ... ... ... ... | 91 12 6 | ... |
| „ fuel ... ... ... ... ... ... | 53 3 9 | ... | „ ghi ... ... ... ... ... | 16 3 0 | ... |
| „ repair and furniture ... ... ... ... ... | 98 12 0 | 778 14 3 | „ separated milk ... ... ... ... ... | 193 11 6 | ... |
| „ packing ... ... ... ... ... ... | 306 1 6 | ... | „ curd ... ... ... ... .. | 10 14 0 | 312 9 0 |
| „ railway freight ... ... ... ... ... | 731 3 0 | ... | „ khoa ... ... ... ... ... | 59 9 6 | ... |
| „ miscellaneous expenses such as postage stamps and stationery, &c. ... | 386 10 4 | ... | „ khir ... ... ... ... ... | 6 8 9 | ... |
| „ rent of bungalow at Aligarh ... ... ... ... | 140 0 0 | 1,563 14 10 | „ realisation on packing and railway freight ... ... | 581 11 6 | 647 13 9 |
| „ depreciation in the value of machinery at 15 per cent. on the value of cost. | 170 0 0 | ... | „ value of stock in hand on 30th September 1892 :— | | |
| „ depreciation on machinery bought for Rs. 271-8-0 and used only for the latter half of the year, at 7½ per cent. | 20 5 9 | 190 5 9 | S. ch. | | |
| | | | „ butter 6 13 ... ... ... ... | 6 13 0 | ... |
| | | | „ cream 44 12 ... ... ... ... | 18 1 4 | ... |
| | | | „ ghi 15 4 ... ... ... ... | 15 4 0 | ... |
| | | | „ whole milk cheese 374 8 ... ... ... ... | 187 4 0 | 227 6 4 |
| | | | „ value of vessels ... ... ... ... ... | 42 14 9 | ... |
| | | | „ „ separated milk given to cattle, 91,770 lbs. at 8 lbs. per anna, *i.e.*, half the usual price. | 716 15 3 | 759 14 0 |
| Total ... | ... | 7,242 5 10 | | | |
| Profit ... | ... | 2,029 15 7 | | | |
| GRAND TOTAL ... | ... | 9,272 5 5 | Total ... | ... | 9,272 5 5 |

S. M. HADI,
*Assistant Director.*

# APPENDIX L.

*Statement showing the disposal of milk at Cherat dairy during the year ending 30th September 1892.*

| Month. | Quantity of whole-milk used. | Manufacture of cheese from whole milk. | | Separation of cream. | | | Manufacture of butter. | | Disposal of separated milk. | | | | | | Remarks. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Quantity of whole-milk used. | Weight of cheese made. | Weight of whole-milk put in separation. | Weight of separated milk. | Weight of cream. | Weight of cream used. | Weight of butter made. | Made into cheese. | | Made into khoa. | Made into curd or khir. | Sold as separated milk. | Given to cows or calves. | |
| | | | | | | | | | Weight of milk used. | Weight of cheese made. | | | | | |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | |
| | lbs. | lbs. | lbs. | lbs. | lbs. | lbs. | lbs. | lbs. | lbs. | lbs. | lbs. | lbs. | lbs. | lbs. | |
| October 1891 ... ... | 2,062 | 1,296 | 144 | 766 | 638 | 128 | 128 | 41 | 144 | Included in col. 4. | ... | ... | ... | 494 | |
| November „ ... ... | 4,520 | 190 | 19 | 4,330 | 3,596 | 734 | 731 | 232 | 934 | 64 | ... | 528 | 106 | 2,028 | |
| December „ ... ... | 5,958 | .... | ... | 5,958 | 4,958 | 1,000 | 972 | 344 | 3,134 | 232 | ... | 118 | 534 | 1,172 | |
| January 1892 ... ... | 16,444 | 1,126 | 120 | 15,318 | 12,766 | 2,552 | 2,464 | 858 | 1,652 | 160 | 1,758 | 10 | 594 | 8,752 | |
| February „ ... ... | 16,952 | 1,206 | 128 | 15,746 | 13,126 | 2,620 | 2,620 | 866 | 252 | 16 | 2,190 | ... | 3,078 | 7,606 | |
| March „ ... ... | 16,804 | ... | ... | 16,804 | 14,004 | 2,800 | 2,798 | 940 | 2,090 | 130 | 1,302 | 222 | 2,824 | 7,566 | |
| April „ ... ... | 16,206 | 1,168 | 116 | 15,038 | 12,532 | 2,506 | 2,506 | 801 | 2,196 | 100 | ... | ... | 1,760 | 8,576 | |
| May „ ... ... | 15,100 | 2,416 | 220 | 12,684 | 10,570 | 2,114 | 2,092 | 548 | ... | ... | ... | ... | 2,140 | 8,430 | |
| June „ ... ... | 16,129 | 388 | 40 | 15,741 | 13,117 | 2,624 | 2,615 | 756 | 4,844 | 323 | ... | ... | 728 | 7,545 | |
| July „ ... ... | 16,219 | 2,314 | 232 | 13,905 | 11,568 | 2,337 | 2,325 | 785 | ... | ... | ... | ... | 347 | 11,221 | |
| August „ ... ... | 19,936 | 2,822 | 282 | 17,114 | 14,268 | 2,846 | 2,880 | 912 | ... | ... | ... | ... | 260 | 14,008 | |
| September „ ... ... | 18,880 | 1,437 | 157 | 17,443 | 14,536 | 2,907 | 2,883 | 899 | ... | ... | .. | ... | 164 | 14,372 | |
| Total ... | 1,65,210 | 14,363 | 1,458 | 1,50,847 | 1,25,679 | 25,168 | 25,014 | 7,982 | 15,246 | 1,025 | 5,250 | 878 | 12 535 | 91,770 | |

S. M. HADI,
*Assistant Director.*

## APPENDIX M.

*Statement showing the sale and stock of dairy produce.*

| Month. | Butter. | | Ghi. | | Cream. | | Cream cheese. | | Whole-milk cheese. | | Skim cheese. | | Khoa and khir. | | Dahi. | | Separated milk. | | Total. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Quantity. | Value. | Quantity. | Value. | Quantity. | Value. | Quantity. | Value. | Quantity. | Value. | Quantity. | Value. | Quantity. | Value. | Quantity. | Value. | Quantity. | Value. | |
| | lbs. oz. | Rs. a. p. | lbs. oz. | Rs. a. p. | lbs. oz. | Rs. a. p. | lbs. oz | Rs. a. p. | lbs. oz. | Rs. a. p. | lbs. oz. | Rs a. p. | lbs. oz. | Rs. a. p. | lbs. oz. | Rs. a. p. | lbs. oz | Rs. a. p. | Rs. a. p. |
| October 1891 ... | 18 0 | 9 5 0 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 9 5 0 |
| November „ ... | 201 0 | 110 1 6 | 4 0 | 2 0 0 | 1 0 | 0 6 0 | 1 0 | 1 0 0 | 43 8 | 22 4 0 | ... | ... | ... | ... | 528 0 | 7 6 3 | 106 0 | 1 10 3 | 144 12 0 |
| December „ ... | 345 0 | 259 2 0 | 4 0 | 2 0 0 | 0 8 | 0 4 0 | 4 0 | 4 0 0 | 31 6 | 23 8 6 | 53 8 | 13 6 0 | Khir 820 0 | 6 6 6 | ... | ... | 534 0 | 8 5 6 | 317 0 6 |
| January 1892 ... | 839 11 | 676 2 10 | 10 0 | 5 0 0 | 1 0 | 0 8 0 | 18 13 | 18 13 0 | 6 10 | 5 15 6 | 10 4 | 3 13 6 | 255 2 | 24 1 9 | ... | ... | 594 0 | 10 4 6 | 744 11 1 |
| February „ ... | 869 4 | 760 9 5 | 7 14 | 3 15 0 | 1 8 | 0 12 0 | 12 4 | 12 4 0 | 71 3 | 53 6 3 | 90 4 | 23 13 6 | 246 4 | 22 11 3 | ... | ... | 3,078 0 | 48 1 9 | 925 9 2 |
| March „ ... | 940 6 | 822 13 3 | 2 0 | 1 0 0 | ... | ... | 1 0 | 1 0 0 | 3 4 | 2 7 0 | 17 8 | 4 6 0 | 159 0 | 11 14 9 | 222 0 | 3 7 9 | 2,824 0 | 33 0 3 | 880 1 6 |
| April „ ... | 780 14 | 683 4 3 | ... | ... | ... | ... | ... | ... | 86 1 | 64 8 9 | 50 0 | 12 8 0 | 35 12 | 1 0 0 | ... | ... | 1,760 0 | 26 0 3 | 787 5 3 |
| May „ ... | 545 7 | 477 4 1 | ... | ... | ... | ... | ... | ... | 20 0 | 15 0 0 | 40 12 | 10 3 0 | ... | ... | ... | ... | 2,140 0 | 33 7 3 | 535 14 4 |
| June „ ... | 741 14 | 730 13 3 | ... | ... | ... | ... | ... | ... | 12 8 | 9 6 0 | 86 0 | 21 8 0 | ... | ... | ... | ... | 728 0 | 22 12 0 | 784 7 3 |
| July „ ... | 760 8 | 738 7 0 | 3 0 | 1 8 0 | 2 0 | 1 0 0 | ... | ... | 58 0 | 46 6 0 | 8 8 | 2 2 6 | ... | ... | ... | ... | 347 0 | 5 6 9 | 794 14 3 |
| August „ ... | 934 12 | 882 13 6 | 0 8 | 0 4 0 | ... | ... | ... | ... | 25 6 | 14 5 0 | ... | ... | ... | ... | ... | ... | 260 0 | 2 2 0 | 899 8 6 |
| September „ ... | 898 10 | 854 11 3 | 1 0 | 0 8 0 | ... | ... | ... | ... | 29 6 | 22 1 0 | ... | ... | ... | ... | ... | ... | 164 0 | 2 9 0 | 879 13 3 |
| Total ... | 7,875 6 | 7,005 7 4 | 32 6 | 16 3 0 | 6 0 | 2 14 0 | 37 1 | 37 1 0 | 387 4 | 279 4 0 | 356 12 | 91 12 6 | 1,516 2 | 66 2 3 | 750 0 | 10 14 0 | 12,535 0 | 193 11 6 | 7,703 5 7 |
| Stock on 30th September 1892. | 13 10 | 6 13 0 | 30 8 | 15 4 0 | 87 8 | 11 14 6 | ... | ... | 747 0 | 187 4 0 | ... | ... | ... | ... | ... | ... | ... | ... | 221 3 6 |

S. M. HADI,
*Assistant Director.*

## APPENDIX N.

The following note on the utilization of bone manure was drawn up by the Assistant Director after the report had gone to Press and had therefore been entered in an appendix.

The experiments have been made in compliance with the direction of the Government of India.

*Note on utilization of bone for manurial purposes.*

The promotion of the use of bone as a fertilizer of soil among the native agriculturists has been a matter of special consideration on the part of Government owing to the fact that during the last few years heavy exports of bones have been made to foreign countries which deprive this country of one of its most valuable manurial resources. To effect this end it is essentially necessary to demonstrate its advantages to the native cultivators by explaining to them the definite results of experiments conducted at the farm, and to distribute bone-meal among the neighbouring agriculturists gratis with the object of inducing them to learn the use of it, as manure, and eventually to become convinced of the value of the substance as a fertilizer.

Experiments with bone-manure were consequently conducted at the Cawnpore Farm and Cherat usar on the lines indicated in G. O. No. $\frac{1580}{\text{I—568A.}}$, dated 4th July 1891, and bone-meal distributed free of cost among the cultivators in the vicinity of the Farm and Cherat usar.

For Cawnpore some 50 maunds of bone-dust were obtained from the Allahabad Jail at the rate of Re. 1-8-0 per maund; while at Cherat raw bones were collected and crushed with *dhekli*. The cost of collecting and crushing the same was annas 10 per maund.

At the Cawnpore Farm, sugarcane and indigo crops were treated experimentally with bone manure during the year under report as directed by the Government. Its good effect on wheat and maize has already been confirmed by experiments carried on in the past years.

Three plots of the farm were under this experiment, two of which had been planted with *pounda* cane and one sown with indigo.

Bone manure was tried at Cherat on sugar-cane in addition to wheat.

The results obtained at these two places are summarized in the table subjoined :—

| Plot. | | Crop. | Manure. | | Outturn. | | Price. | | Remarks. |
|---|---|---|---|---|---|---|---|---|---|
| No. | Area in acre. | | Name. | Quantity per acre. | Yield of the plot. | Yield per acre. | Of the yield of plot. | Of yield per acre. | |
| | | | | FARM. | | | | | |
| | | | | M. s. c. | M. s. c. | M. s. c. | Rs. a. p. | Rs. a. p. | |
| 2 | $\frac{27}{100}$ | Indigo ... | Bone-dust ... | 1 0 0 | 18 0 0 | 106 27 0 | *4 3 3 | 24 14 3 | *At Rs. 23-5-6 per 100 maunds. |
| | | | Farmyard manure ... | 120 0 0 | | | | | |
| 3 | $\frac{2}{5}$ | Ditto ... | Ditto ... | 120 0 0 | 35 20 0 | 88 30 0 | 8 4 7 | 20 11 0 | Ditto. |
| | | | | | Number. | Number. | | | |
| 436 | 1 | Sugarcane ... | Bone-dust ... | 20 0 0 | 21760 | 21760 | †170 0 0 | 170 0 0 | †At 24 canes per anna. |
| 438 | 1 | Ditto ... | Bone ... ... | 20 0 0 | 19807 | 19807 | 163 0 0 | 168 0 0 | Ditto. |
| 440 | 1 | Ditto ... | Unmanured ... | ... | 15840 | 15840 | 123 12 0 | 123 12 0 | Ditto. |
| | | | | CHERAT USAR. | | | | | |
| | | | | M. s. c. | M. s. c. | M. s. c. | | | |
| | 1 | Wheat ... | Bone-dust ... | 4 20 0 | 8 20 0 | 8 20 0 | ‡21 4 0 | 21 4 0 | ‡ At Rs. 2-8-0 per maund. |
| | $4\frac{1}{2}$ | Ditto ... | Farmyard manure ... | 128 0 0 | 24 0 0 | 5 13 5 | 60 0 0 | 60 0 0 | |
| | $\frac{15}{16}$ | Sugarcane ... | Ditto ... | 80 0 0 | ... | ... | ... | ... | Crops still standing. |
| | $\frac{1}{4}$ | Ditto ... | Ditto ... | 128 0 0 | ... | ... | ... | ... | |
| | | | Bone-meal .. | 3 0 0 | | | | | |

Indigo treated with bone-dust and farmyard manure at the Cawnpore Farm shows an excess of Rs. 2-3-3 per acre in the price of the yield as compared with the yield of an equal area treated with farmyard manure alone. Deducting Re. 1-8-0, the cost of bone-manure applied to the area, the net increase per acre amounted to Rs. 2-11-3.

Similarly the profit on the cane-crop treated with bone-dust gave a net increase of Rs. 16-4-0 in one instance, of Rs. 14-4-0 in another as compared with the yield of the unmanured plot.

The results obtained at the Cawnpore Farm are so far very satisfactory and encouraging.

The effect of bone-meal on wheat and sugarcane with reference to the experiments made at the Government usar farm at Cherat has already been noticed in detail in the body of the annual report on Cherat and the remarks are therefore not repeated here.

*Distribution of bone-meal among cultivators in the neighbourhood of the Cawnpore Farm and Cherat usar.*

At Cawnpore 6 maunds of bone-meal was given gratis to three neighbouring cultivators of the farm, of whom two tried it on wheat and the third on *pounda* cane.

Similarly 12 maunds of bone-meal was distributed at Cherat to six private cultivators who all tried it on wheat only.

The following is the comparative statement of the results of experiments conducted by cultivators in the neighbourhood of the Cawnpore Farm.

| Cultivator. | Plot. Number. | Plot. Area in acre. | Crop. | Manure applied to the plot. Description. | Quantity. | Price. Rate. | Price. Total. | Outturn. Quantity. | Price. Rate. | Price. Total. | Calculation per acre. Manure applied. Quantity. | Manure applied. Price. | Outturn. Quantity. | Outturn. Price. | Financial result. Gain. | Financial result. Loss. | Remarks. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | M. s. c. | Rs. a. p. | Rs. a. p. | M. s. c. | Rs. a. p. | Rs. a. p. | M. s. c. | Rs. a. p. | M. s. c. | Rs. a. p. | Rs. a. p. | Rs. a. p. | |
| | | | | | | | | RABI. | | | | | | | | | |
| Jeorakhan ... | 256 | ¼ | Wheat ... | Bone-meal | 2 0 0 | 0 10 0 per md. | 1 4 0 | 5 0 0 | 2 8 0 per md. | 12 8 0 | 8 0 0 | 5 0 0 | 20 0 0 | 50 0 0 | ... | 4 0 0 | |
| Ditto ... | 251 | ½ | Do. ... | Farm yard manure. | 100 0 0 | 3 0 0 „ | 3 0 0 | 11 0 0 | 2 8 0 „ | 27 8 0 | 200 0 0 | 6 0 0 | 22 0 0 | 55 0 0 | ... | ... | |
| | | | | | | | | KHARÍF. | | | | | | | | | |
| Ditto ... | 256 | ¼ | Maize ... | Do, ... | 60 0 0 | 3 0 0 „ | 1 12 0 | 3 0 0 | 2 0 0 „ | 6 0 0 | 240 0 0 | 7 3 0 | 12 0 0 | 24 0 0 | 6 0 0 | ... | |
| Ditto ... | 251 | ½ | Do. ... | Do. ... | 120 0 0 | 3 0 0 „ | 3 9 6 | 4 20 0 | 2 0 0 „ | 9 0 0 | 240 0 0 | 7 3 0 | 9 0 0 | 18 0 0 | ... | ... | |
| | | | | | | | | RABI. | | | | | | | | | |
| Gopal Lodh ... | 644 | ¼ | Wheat ... | Bone-meal | 2 0 0 | 0 10 0 „ | 1 4 0 | 5 8 0 | 2 8 0 „ | 13 0 0 | 8 0 0 | 5 0 0 | 20 32 0 | 52 0 0 | 3 3 0 | ... | |
| Ditto ... | 645 | ½ | Do. ... | Form yard manure. | 120 0 0 | 3 0 0 „ | 3 9 6 | 10 8 0 | 2 8 0 „ | 25 8 0 | 240 0 0 | 7 3 0 | 20 16 0 | 51 0 0 | ... | ... | |
| | | | | | | | | KHARÍF. | | | | | | | | | |
| Ditto ... | 644 | ¼ | Do. ... | Do. ... | 50 0 0 | 3 0 0 „ | 1 8 0 | 3 20 0 | 1 0 0 per 24 seers. | 5 13 4 | 200 0 0 | 6 0 0 | 14 0 0 | 23 5 4 | 4 10 8 | ... | |
| Ditto ... | 645 | ½ | Do. ... | Do. ... | 100 0 0 | 3 0 0 „ | 3 0 0 | 5 24 0 | 1 0 0 „ | 9 5 4 | 200 0 0 | 6 0 0 | 11 8 0 | 18 10 8 | ... | ... | |
| | | | | | | | | KHARÍF. | | | | | | | | | |
| | | | | | | | | Number. | | | | | Number. | | | | |
| Debi Kachi ... | 342 | ⅛ | Pounda | Bone-meal | 2 0 0 | 0 10 0 „ | 1 4 0 | 1772 to | 0 0 1½ per cane | 13 13 6 | 16 0 0 | 10 0 0 | 14176 | 110 12 0 | 59 2 6 | ... | |
| Ditto ... | 336 | ¼ | Do. ... | Poppy stalks. | 80 0 0 | 10 0 0 per 100 mds. | 8 0 0 | 2355 | 0 0 1½ „ | 18 6 4½ | 320 0 0 | 32 0 0 | 9420 | 73 9 6 | ... | ... | |

Comparing plot No. 256 with 251 there was a net loss of Rs. 4 in the yield of the former which was treated with bone-meal. This is attributable to the unusually luxuriant growth of the straw at the expense of the grain and the consequent "lodging" of the bone-treated wheat crop. However the yield of the same field in kharíf in which season it was manured with farmyard manure alone gave a net increase of Rs. 6 over the yield of the other plot which had been treated with farmyard manure only both in rabi and kharíf. This shows that the increased yield in kharíf was due simply to the effect of the residue of bone-meal applied in the previous rabi season. And this result is perfectly consistent with reason, inasmuch as a dry season like rabi is hardly favorable to complete decomposition of the bone manure and its full utilization by the crop grown. Deducting Rs. 4, the loss in rabi, from Rs. 6, the gain in kharíf, there was a net gain of Rs. 2 per acre to the cultivator, even though his bone-treated rabi crop had produced unfavorable results. It is however hard to make an ignorant cultivator of Jeo Rakhan's type look upon matters in this light.

The results in the case of the second cultivator are more favorable, the gain per acre to him being Rs. 3-3-0 in rabi and Rs. 4-10-8 in kharíf.

The results obtained by the third cultivator, Debi Kachi, with his cane-crop are highly gratifying, his profit from the bone-treated field being Rs. 59-2-6 per acre, and the cane too was very superior in quality.

The table given below shows the results obtained by the cultivators in the neighbourhood of Cherat usar :—

| Cultivator. | Area of plot in acre. | Crop. | Manure. | | Outturn. | | Price of manure per acre. | Price of outturn per acre. | Gain or loss per acre. |
|---|---|---|---|---|---|---|---|---|---|
| | | | Name. | Quantity. | Actual. | Per acre. | | | |
| | | | | | Rs. a. p. | Rs. a. p. | Rs. a. p. | Rs. a. p. | Rs. a. p. |
| 1. Rup Singh ... | $\frac{13}{10}$ | Wheat... | Bone-meal | 5 mds. | 6 35 0 | 8 18 0 | 3 2 0 | 21 2 0 | + 9 10 6 |
| 2. Harnam Singh... | $\frac{13}{32}$ | Do. ... | Do. ... | Do. ... | 4 5 0 | 10 6 0 | 3 2 0 | 25 6 0 | +13 14 6 |
| 3. Doongar Singh... | $\frac{13}{32}$ | Do. ... | Do. ... | Do. ... | 3 10 0 | 8 0 0 | 3 2 0 | 20 0 0 | + 8 8 6 |
| 4. Nath Singh ... | $\frac{13}{32}$ | Do. ... | Do. ... | Do. ... | 2 11 0 | 5 24 0 | 3 2 0 | 14 0 0 | + 2 8 6 |
| 5. Seva Singh ... | $\frac{13}{32}$ | Do. ... | Do. ... | Do. ... | 2 0 0 | 4 37 0 | 3 2 0 | 12 5 0 | × 0 13 6 |
| 6. Lachmi Singh ... | $\frac{13}{32}$ | Do. ... | Do. ... | Do. ... | 2 0 0 | 4 37 0 | 3 2 0 | 12 5 0 | + 0 13 6 |
| Plot for comparison | $\frac{13}{32}$ | Do. ... | Cow-dung | 128 mds. | 1 38 0 | 4 32 0 | 3 10 6 | 12 0 0 | |

The first 6 plots were manured with bone-meal. Comparing their yield with that of the last plot which was treated with dung only, there would appear to be more or less increase in the yield of each bone-treated plot. The soils were all similar in their nature. But some fields were tilled more carefully and laboriously than others. We therefore observe a marked difference in the outturn of the several plots, but all tending to prove the superiority of bone as a fertilizer.

About 80 maunds of bone have been collected at Cherat and will soon be crushed to bone-meal, with which experiments at Cherat and the Cawnpore Farm will be repeated this year in fields belonging to the Department as well as to private cultivators, special attention being paid to sugar-cane and indigo crops as required by Government. The Farm Superintendent of Cawnpore has also been directed to procure bone-meal for use in the sugar-cane crop of ensuing season.

LUCKNOW:
*The 11th February* 1893.

S. M. HADI,
*Assistant Director.*

# ORDERS OF GOVERNMENT.

No. $\frac{1442}{\text{I—218}}$ OF 1893.

FROM

THE CHIEF SECRETARY TO GOVERNMENT,
N.-W. PROVINCES AND OUDH,

TO

THE DIRECTOR OF LAND RECORDS AND AGRICULTURE,
N.-W. PROVINCES AND OUDH.

DATED NAINI TAL, THE 27TH MAY 1893.

SIR,

I AM directed to acknowledge the receipt of your letter No. 96, dated 28th January 1893, with which you forwarded the annual report on those portions of the work of your Department in 1891-92 which are reported directly to Government.

2. For the public appreciation of the variety and importance of the duties that devolve upon the Director it is unfortunate that the report of his annual operations goes partly to the Board of Revenue and partly to Government and that there is no single survey of the work he has done. The report to Government concerns the least prominent of his duties. The supervision of the establishment of patwáris and kánúngos for the maintenance of the village records, the inspection of districts preparatory to a revision of assessment, and the investigation of the causes which render particular parts of the country liable to famine find their place in the separate report submitted to the Board of Revenue. In regard to this last matter the Lieutenant-Governor is glad to note that the arrangements for the preparation of an analysis of precarious tracts have now been completed. It is necessary that reliable information should be available, and that it should be in a convenient form. The pargana book provides the chief source of this information, and you submitted proposals for improving the existing form of the book and supplementing it by a permanent record to be kept up in English in the Collector's office. Since the close of the year dealt with in your report these proposals have been considered by the Board of Revenue and Government; the preparation from the settlement records of a note, with appendices, to be attached to the tahsíl pargana books—copies remaining in the Collector's office and with the pargana officer—has been sanctioned; and the amended form of the pargana book proposed by your predecessor is to be worked out by an officer who has been placed on special duty. The Lieutenant-Governor attaches great importance to the pargana book, and he trusts that when a convenient form has been devised it will be maintained and used. The delay which under

our revenue system occurs in giving relief in cases of over-assessment, and of deterioration of villages since settlement, is one of the faults of our administration. And it is lamentable to see the mischief that has occurred in Etah, Mainpuri and elsewhere from a failure to observe the mischief at work, and slowness in applying the proper remedy, notwithstanding all that has been done of late years to provide the Collector with the means of keeping himself well informed of the condition of his district.

3. The subject of chief interest among those minor matters of your Department which are covered by the present report is the result of the experiments made for the reclamation of *usar* land. There were four tracts under the management of your Department, in all of which the same treatment was adopted. They were enclosed so as to protect the grass from being grazed, in the hope that the decaying grass would lead to the formation of a good layer of surface soil. In two of the experimental areas this treatment has been continued; in the two others the plan of cultivation has been tried. The result shows that the latter alone is successful and profitable. In both of these there has been a small surplus; in both the others the excess of expenditure over receipts has been very large. The issue of these careful and protracted experiments has a very important bearing on the question, which has again come under discussion, of the feasibility of forming fodder reserves in the Gangetic plain. Sanction has been given to the sale for Rs. 2,050 of the Amramau plot. Taking this sum into consideration, the total receipts are Rs. 8,824 against a total expenditure of Rs. 8,640. There has thus been a slight gain on the experiment which has lasted eleven years, during the first three of which the land was maintained as a fodder reserve.

The Juhi plot has been till the present under grass, and the land is now reported to be good enough for cultivation, but the expenditure has amounted to Rs. 2,462 and the receipts have been only Rs. 78.

At Cherat near Aligarh various experiments are in course of trial. Deep ploughing and manuring, which proved so successful at Amramau, have been introduced; a herd of cattle is kept to supply milk to the dairy and manure to the fields, and fuel and fodder are also produced. The outturn of grass has improved, but many of the trees are reported to be stunted from their roots having reached the kankar substratum. One interesting result of the experiments in cultivation in this plot is that sugarcane is found to extract salt from the soil, and to be useful and advantageous for planting in saline tracts, though the outturn of sugar is not large.

The remaining plot, Gursikran, is almost entirely a fuel and fodder reserve.

4. Leaving out of consideration the Amramau plot, which has passed out of the hands of your Department after repaying the

expenditure incurred in its reclamation, the receipts and expenditure in connection with these experiments compare as follow:—

| | *Receipts.* | *Expenditure.* |
|---|---|---|
| | Rs. | Rs. |
| Juhi ... ... ... | 78 | 2,462 |
| Cherat ... ... ... | 3,903 | 15,634 |
| Gursikran ... ... | 3,203 | 6,985 |
| Total ... | 7,184 | 25,081 |

The stock and buildings at Cherat are valued at Rs. 13,106. If this is added to the receipt side there remains a deficit of Rs. 4,791.

5. District arboriculture is under the management of the District Boards, and 265 miles of new avenues have been planted, bringing the total length of avenues to 5,447 miles. Private assistance has been tendered in 12 districts. The Commissioner of Agra strongly disapproves of allowing zamindárs to plant trees. This opinion is probably too strong. It is apparent however from the reports that the work of tree planting is not always carried out in an efficient manner by private persons any more than by the Boards. No use seems to be made of the experience of successful planters. Each Board seems to have not only a method of its own, but various methods at different times. It is believed that much money is being wasted (1) by planting out the trees too young, (2) by insufficient protection and care of the trees, and (3) by using wrong kinds of trees. I am to ask you to draw up a set of instructions for the guidance of the Boards in this work.

There has been a considerable falling off in the receipts under arboriculture in the Meerut Division: in Meerut itself the price realised for trees sold was very low, and you conjecture that the trees were unusually small. The sale of very young trees seems an improvident measure.

6. Arboriculture is least profitable in the Bundelkhand districts and Mirzapur, where the total average receipts are only Rs. 2,220 against an average expenditure of Rs. 14,889. The figures suggest a want of proper and systematic management, and the Commissioners of Allahabad and Benares will be desired to look into the matter during the next tour season.

The main practical questions in the extension of these road avenues are to restrain new undertakings within limits suited to the establishment and the funds at the disposal of the Boards, to fill vacant places in existing avenues before making new avenues, and to plant trees which will be hardy and useful.

The question of the allocation of nurseries is also one requiring attention. Bareilly with no nurseries and Bánda with 19 represent two extremes between which a middle course appears to be eminently desirable. These are all matters which you can include in the instructions.

7. At the Cawnpore Experimental Farm the economy of using an improved, though not deep, plough for the cultivation of wheat in light *dumat* soil has been established. It is evidence of a real advance in the experiments of the Department that native cultivators are beginning to appreciate the improved plough and the chain pump, and readily take these articles on hire.

You have given an interesting account of the experiments made at the Meerut Demonstration Farm and other private farms, the progress of which the Lieutenant-Governor will watch with interest.

8. The *Agricultural Journal*, which is published by your Department and has a monthly circulation of 393 copies, is mentioned as an instrument for the diffusion of the knowledge gained by agricultural experiments. The Lieutenant-Governor fully acknowledges the value of the Journal, and hopes that it will be found possible to bring it out in Hindi as well as in Urdu. In the present state of education the instruction it contains will hardly reach the mass of the people, unless arrangements are made for having it read to them and explanatory lectures given on the subjects treated of. You may be able to take some steps in this direction through the patwáris and kánúngos. As a means of imparting knowledge to the ordinary cultivator, who is after all the person whom it is important to instruct, greater importance attaches to the agricultural shows, with their practical demonstrations in the way of competitions between native and improved implements and methods, and to the examples furnished by enlightened landlords, such as those who have established the private farms already mentioned.

9. The traffic with Nepal and Thibet was of a normal character. The only road traffic registered was that in the districts about to be opened up by the new Lucknow-Rae-Bareli-Jaunpur Railway. The number of divisions for the registration of rail-borne traffic was reduced from 7 to 6 by the absorption of the Jhánsi in the Allahabad Division. There was a decrease in imports and a considerable increase in exports, the result being an increase in the total value of imports and exports from Rs. 28,27,74,808 to Rs. 30,47,57,240. These variations are, as you explain, due to bad seasons causing a diminution of the grain stocks in the preceding year and followed by good harvests and replenishment of stocks in the year under report. Concurrently with the replenishment of the grain stores there was a demand for the exportation of wheat to Europe. This exportation of wheat is the most important feature of the year's trade of the Provinces. The exports of wheat amounted to 9,908,142 maunds, a record figure, the nearest approach to which was 8,497,924 maunds in 1883-84. You consider the apprehensions that have been expressed as to the effect of this drain on the food resources of the country to be unfounded as it did not lead to larger imports of other food grains. Whether the export of wheat has led to a change in the staple food of the people in the North-Western Provinces is a question of interest to which you may be able to reply.

10. The Civil Veterinary Department was established during the year, and Veterinary Captain Rayment was appointed Superintendent of the Department in these Provinces. The entertainment of a few trained salutris and a grant of Rs. 7,000 for the purchase of stallions have been sanctioned. You will be in a position to describe the progress which has been made in your next annual report.

11. The possibility of making good butter even in the hottest weather in the plains of India and of sending it long distances without deterioration has been established at the Aligarh Dairy. You will have to consider whether the intentions of the Government by proving the advantage of scientific dairy farming have been sufficiently fulfilled, or whether endeavours should be made to meet the constantly increasing demand.

12. In conclusion I am to convey to you the acknowledgments of Government for your full and interesting report, and to your Personal Assistant, Babu Lachman Prasad, for the valuable aid which he has afforded you in the successful execution of your very laborious and important duties.

I have the honor to be,

SIR,

Your most obedient servant,

J. J. D. LATOUCHE,

*Chief Secy. to Govt., N.-W. P. and Oudh.*

# REPORT ON THE OPERATIONS

OF THE

# DEPT. OF LAND RECORDS AND AGRICULTURE,

## NORTH-WESTERN PROVINCES AND OUDH,

**For the year ending 30th September 1893.**

No. $\frac{154}{\text{VIII}-1}$ OF 1893.

FROM

J. O. MILLER, ESQ.,

DIRECTOR OF LAND RECORDS AND AGRICULTURE,
N.-W. PROVINCES AND OUDH,

To

THE CHIEF SECRETARY TO GOVERNMENT,
N.-W. PROVINCES AND OUDH.

*Dated Lucknow, the 1st November* 1893.

SIR,

I HAVE the honor to submit the annual report on the work of this Department for the year ending 30th September 1893. In accordance with the wish of the Government of India, the Land Records work will be dealt with in more detail than before, and the other sections will be abbreviated: while the report will be confined, as far as practicable, to a notice of the work done by the Director and his Assistant, and to the mention of the more important measures or events coming under each of the prescribed heads.

2. I was in charge of the Department throughout the whole of the year under report. The Assistant Director, Sayyid Muhammad Hadi, was on sick leave at the commencement of the year, and Babu Lachman Parshad was acting for him. He returned from leave in October, but fell ill again in the end of December, and was obliged to go on leave from February to April. During his absence Babu Lachman Parshad again officiated. The cold weather was mainly taken up with work connected with preliminary reports on districts coming under settlement, the number of which was somewhat greater than usual. I was engaged till nearly the middle of November on the compilation of a memorandum on some matters connected with the condition of the labouring and agricultural classes during the last ten years. The districts of Fyzabad and Lucknow were then examined with a view to the preparation of the usual report preliminary to settlement, and visits were paid to the districts of Bara Banki and Sultánpur, where settlement operations had commenced. I intended that the Assistant Director should prepare a report on Sitapur, the settlement of which expires shortly, but owing to his ill-health, he was unable to proceed with the work, and I made a tour round the greater part of the district in January. A few days were spent at Benares in company with the Sanitary Engineer and other officers in connection with the proposals to have a sewage farm there, and a visit to Lalitpur followed to obtain some further information required by the Board of Revenue on settlement questions, especially in connection with the probable effects of the re-assessment of the favoured tenures in that district known as *ubáris*. The last part of the cold weather was taken up with an examination preliminary to settlement of the district of Bijnor. In the rainy season the usual

Kanúngo examinations were held by the Assistant Director and myself, at Cawnpore, Lucknow, Fyzabad, Benares, Aligarh, and Bareilly; visits were paid to Allahabad, Mirzapur, and Benares, to settle questions connected with the introduction of the new complex khewat; the grass farm at Allahabad was visited in accordance with the wishes of the Government of India; some matters connected with the Táj Garden were discussed with the Collector at Agra, and a visit was paid to the Instruction Farm conducted by the Civil Veterinary Department at Babugarh; the gardens at Saháranpur were inspected and some days spent at Muzaffarnagar, where a special officer is engaged in the experimental preparation of a new form of pargana book. The Dairy and the Úsar Reserves near Aligarh and the Dairy at Lucknow were frequently visited. I had the advantage of inspecting the reserves near Aligarh at one time in company with the Superintendent of the Civil Veterinary Department, and at another time with the Agricultural Chemist to the Government of India, and the question of their management thus came under discussion from various points of view.

## SECTION I.

### Maintenance of Village Records.

3. This section of the report appears in detail in the Annual Report of the Board of Revenue, but some of the more important matters dealt with under this head may be noticed. The re-organization of circles and salaries of patwáris has been completed in many districts and is being carried on in others. In the eastern districts the object of the change is to improve the pay of the patwári, and after considerable correspondence, a very large addition to the salaries of the staff in Basti was sanctioned. Proposals were also made for an increase in the pay of the Bánda patwáris, who had hitherto received in many cases very inadequate remuneration, but these have not yet been sanctioned. In the northern and western districts one of the main objects of the re-organization—a very necessary object at the time—was to secure funds for improving the position of the patwáris elsewhere; and the reductions in pay originally contemplated were more sweeping than is necessary now that a separate Patwári Fund has been created. In Bulandshahr, Muzaffarnagar, and Saháranpur the scheme now being introduced gives the patwáris somewhat more liberal terms than was at first intended; in Bareilly some concessions have been made in favour of those patwáris who were most seriously affected by the proposed reductions; in Moradabad more liberal proposals have been made, and in Sháhjahánpur a complete revision of the arrangements has been approved of, which will save the patwáris from very sweeping reductions proposed some years ago under stress of financial pressure.

4. The Kanúngo School at Cawnpore, started experimentally two years ago, was continued during the year under report: and I think it will in future be possible to insist on all candidates for kanúngoships passing through it. The system of examining candidates at divisional headquarters during the rainy season is extremely unsatisfactory, especially as regards the testing of their qualifications in surveying; while at the school the greater part of their time is devoted to actual survey work. The candidates, both those who appear at the divisional examination and those who come to the school, are nominated by District Officers; and a large proportion of them hold some office already in the district, and belong, to all appearance, to the ordinary *umedwár* class. To secure better men, it is necessary to increase the attractions of the post. The pay is already sufficiently liberal, but the prospects of promotion are uncertain, and I have suggested that employment as a kanúngo should be regarded as one of the regular avenues to the appointment of naib tahsíldár. If it were possible to reserve a certain number of naib tahsíldárships for kanúngos, there is no doubt that the post would be much more sought after, and that it would attract many of the best men desirous of entering Government service.

5. The preparation of the new records of shares in the complex mahál of the Benares Division, made with a view to facilitating the payment of revenue by individual sharers instead of through headmen, has been completed, but has proved to be a

much more laborious and complicated work than was expected at first. One of the Inspectors of the Department was specially deputed to assist the kanúngos placed in charge of this work, and was on this duty for some months.

6. Full reports were submitted on the districts in which settlement operations have shortly to be undertaken, and it seems unnecessary to refer further to the subject here though it occupied nearly the whole of my time during the cold weather. The requirements of this special work interfere seriously with the systematic inspection of kanúngos' and patwáris' work throughout the Provinces. Opportunity is taken of visits to headquarters' stations to inspect the kanúngo offices there, but the carrying out of the actual inspection of patwáris' work throughout districts has to be left to a great extent to the Native Inspectors attached to the Department, and even they are now required for a considerable part of the cold weather for duty in districts coming under settlement. Recent orders indicate that the connection of the Department with settlement operations will be to some extent altered, and one result of the change will probably be to allow more time to be given to the thorough inspection of districts other than those in which settlements are impending.

7. The necessity of a short Survey Manual for the instruction of patwáris has for some time been recognised, and I employed an Inspector of the Department, who was on tour with me last cold weather, to compile one on the model of a book in use in Madras. While the compilation was going on, two treatises, one on Mensuration and one on Surveying, were received from the Board of Revenue, which had been drawn up by Mr. Twigg, late of the Civil Service. These various manuals are now under the consideration of the Board. I consider that the Madras Manual is the best model to follow, but the compilation based on it for use in these Provinces would be improved if revised by a European Survey Officer. I have also been engaged in preparing an abstract of the orders issued from time to time from this Department regarding the duties of patwáris and kanúngos, and in making a collection of extracts from Acts and Circulars with which it is desirable that they should be acquainted. The part of the compilation relating to patwáris is now in the Press, and will be submitted in proof for the orders of the Board of Revenue before steps to circulate it are taken.

## SECTION II.

### Analysis of Districts.

8. Under this section it has been usual to deal with the compilation in a workable and accessible form of the voluminous statistics annually prepared and tabulated for every village by its patwári. These statistics are first of all entered in various statements in what are known as the Mauza and Mahál Registers, and a few of the leading figures indicative of the condition of each village, are then transferred to the Pargana Book, where space is left for remarks by officers when on tour on the progress or decline of the estate. In its present form this record has not altogether fulfilled its object, and during this year revised forms both for the Mauza Register and Pargana Book were sanctioned. They have been introduced in Muzaffarnager, and an estimate submitted of the cost of preparing them in other districts, where settlements have recently been completed. In future it is intended that they shall be prepared under the orders of Settlement Officers. The objects aimed at in drawing up the new forms have been first simplification, and secondly the clear connection of annual statistics with those prepared at settlement. Every endeavour has been used to make the statements as simple and useful as possible, and they have been subjected to a variety of criticism before their forms were finally settled. They will not fully serve their purpose, unless they prove useful in actual work for reference by Revenue Officers of Tahsíls and of the Headquarters Staff. I believe that there is some scepticism as to the possibility of compiling an annual record of agricultural and economic facts relating to each village in such a form as to be really useful for practical work, and therefore take this opportunity of explaining the changes that have been made. At present the statistics of areas and crops of each village are compiled in four separate statements in what is known as the Mauza Register, and

some of these statements are exceedingly long and detailed. Statistics of tenures, rents, and revenue are compiled, not for villages, but for revenue-paying estates (mahâls), as formed at settlement, in three statements, in a separate volume known as the Mahâl Register. To form a clear idea of the progress or decline of a village since settlement, it is necessary to refer to all three statements of the Mahâl Register, and to at least one of the Mauza Register. In the new forms all statistics are compiled Mauzawar, and are entered on consecutive pages of the Register. The statistics of area are prepared in the form adopted in recent settlements; the returns of crops have been greatly reduced and are confined to the chief staples of each district, and the details of tenures and rents have been presented in a simpler and more manageable form. Five pages of this register give all the essential parts of the information previously scattered over seven statements in different parts of two separate registers. The more important figures are then entered in the Pargana Book, which is believed to contain all the information ordinarily required. If it is necessary to supplement this information, a reference can easily be made to the Mauza Register, where the statistics are arranged in the same order, but in more detail. Both in the Register and the Pargana Book, the statistics prepared for the Settlement Officer are given in full, with an abstract of his remarks, and it is thus easy at any time to compare the actual state of any village with its condition, when last assessed to revenue. For every tahsíl or pargana a handbook is also prepared, with information taken from assessment and trade reports regarding its population, resources, tenures, protection from drought, method of assessment, and other points of interest. A list of precarious mahâls, specially requiring attention in seasons of drought, is also attached. I believe that these compilations are likely to afford revenue officers much greater facilities for informing themselves of the condition of their tahsíls or districts, and for detecting the approach of deterioration in any part, than the present system. Changes in the form of returns are necessarily accompanied by some confusion at the outset; but it was absolutely necessary to face this drawback to secure simpler and more intelligible returns.

## SECTION III.

### System of collection of Revenue and Rental in precarious tracts.

9. In these provinces this subject is dealt with by the Board of Revenue rather than by the Land Records Department.

## SECTION IV.

### Measures of Protection, including Arboriculture.

10. **Reclamation of Usar land.**—There were originally four Úsar reserves, two near Cawnpore, and two near Aligarh. For many years they were treated as fuel and fodder reserves; the grass was protected by enclosure and many new varieties introduced, and trees were planted. The operations were successful, but not remunerative, and a few years ago more active attempts were made to reclaim the land by cultivation. These experiments which have been fully described in previous reports, were carried on at three of the reserves—Amramau, Cherat, and Gursikran, and as they had been conducted to a successful issue at Amramau, the experiment was brought to an end and the reserve disposed of.

11. **Juhi Usar.**—In this reserve the experiment has been confined to the sowing or planting of grasses and trees and their protection by enclosure. The land is now well covered with grass, and there are very few bare patches. The typical *úsar* grass (*Sporobolus pallidus*) is still predominant, but many other varieties have gained a footing and promise to do well. The neighbouring villagers have been allowed to cut the grass on some parts for a small payment, and a large quantity has been made into hay, and will be sold in February, when fodder begins to get scarce. The trees in this reserve have done very well. *Babúls* (*Acacia Arabica*) are most numerous; but *shisham* (*Dalbergia sissu*), *ním* (*Melia Indica*), and Paper Mulberry (*Broussonettia Papyrifera*) also do well, and there are a few vigorous specimens of the *dhak* (*Butea frondosa*). A

number of trees have this year been marked for felling; and large numbers have been sown or planted, to keep up the supply. A few trees, of which the products are useful in leather factories (*Terminalia and Phyllanthus*), have been experimentally planted. There can be no doubt that a great part of this reserve could now be successfully cultivated; but I am in favour of further attempts being made to ascertain its possible usefulness as a fuel and fodder reserve.

12. **Cherat and Gursikran Usars.**—The cultivated area at Cherat is now 86 acres, of which 28 are let to tenants at a rental of Rs. 215, and the rest are managed direct. Owing to the heavy winter rains the outturn of spring crops was low, but the rice crops promise remarkably well. This staple is not much grown in Aligarh, and enquiries are frequently made at the reserve for seed of the varieties cultivated there. At Gursikran 106 acres have been brought under the plough, of which 84 were let to tenants at a rent of Rs. 502. The highest yields of wheat and barley were 7 and 7½ maunds per acre; on some plots the wheat was injured by the fungus *sehun*, and the Assistant Director intends to take the opportunity of experimenting with the infected seed, which will be sown both at the reserve and at Cawnpore after being steeped in—

(1) Kerosine oil.
(2) Coal tar.
(3) A solution of copper sulphate and lime.

The rice crops on this reserve did not do well, the highest yield being 5½ maunds per acre.

13. At both these reserves, as at Juhi, special attention has been given to the question of the supply of fodder. The silage made last year at Cherat was excellent, and was readily eaten by the cattle: this year new silos have been made both at Cherat and Gursikran, and have been filled with grass or with a small quantity of fodder crops. Hay-making is also being carried on on a larger scale than before; and a part of the Gursikran reserve will be made over to the neighbouring villagers to cut grass from either gratuitously or at a low price: the object being to interest them in the maintenance of the reserves, and to teach them the possibility of increasing the supply of grass from waste lands. Large numbers of trees (chiefly *babul*) have been planted, but many dried up during a long break in July and August. In accordance with a suggestion of Dr. Voelcker's, the *dhak* tree is also being tried, and some 70 plants at Cherat and 80 at Gursikran are doing well.

14. *General remarks.*—The experiments in cultivation have shown that *úsar* lands, such as those at Cawnpore and Aligarh, can be cultivated if necessary; and where population is dense, as in parts of Oudh, cultivation may be seen carried on on land not very dissimilar in outward appearance to those where we have made our experiments, and on somewhat similar lines. The reclamation of the *úsar* with the plough will be persevered with, but I retain the opinion I expressed last year, that it is more important at present to ascertain the possibility of utilizing those lands for provision of fodder and fuel. The necessity of impressing on cultivators the advantages of improving and economising their supplies of fodder, and of providing a supply of fuel, is generally recognised. The lands taken up by the Department were grazing grounds originally, and are still surrounded by grazing lands. It is interesting and useful to show how these can be cultivated when the necessity arises, but this has now been done, and I do not think the original objects of the experiment will be served by merely reclaiming the land and disposing of it as fit for the plough. Increased attention is therefore being given to the planting of trees and to ensilage and hay-making. Very good evidence has been obtained of the injurious effects of grazing. At Cherat where operations have to be subordinated to the interests of the dairy, the supply of grass has undoubtedly deteriorated, and the ground has again become very bare owing to the amount of grazing; while at Juhi, where a number of the Lucknow dairy cattle have been kept, the portion of the reserve allotted to them compares very unfavourably with the rest; and the amount of damage done by grazing during the rains is obvious. At Cherat during the last rains the cattle were strictly confined to a portion of the reserve, and at Juhi there will be no necessity to allow grazing at that season in future.

15. Whether the reserves will ever pay their way, if used for the supply of fodder and fuel, is doubtful, but the point deserves further trial before the experiment is abandoned. The great difficulty is the expense of labour. At Juhi this year the yield of hay was 17½ maunds per acre, and the cost of cutting, Rs. 2. At Cherat each acre yielded five maunds, and the cost of cutting was about a rupee. At Gursikran the cost was a little more, but the yield was twice as great. For the hay when made, there is little demand at present, because it is not the custom to use hay; and at this season good fodder can be had at much lower prices. *Bhúsa* is reported to sell in these parts at six maunds per rupee, and *khurti* (*Cyamopsis psoralioides*) at 12 maunds; but later in the season the hay may come into use. The objects now to be aimed at are the reduction of the cost of cutting and the improvement of the quality of the hay. At present the hay made from the *úsar* grasses has not a good reputation, but the Agricultural Chemist on his visit to the reserve pronounced the last year's stock of hay to be by no means of poor quality. A semi-aquatic grass, known as *bat* and introduced by Mr. Duthie, promises to give a large yield of excellent fodder.

16. The *úsar* reserves have been frequently visited both by the Assistant Director and myself. The Superintendent of the Civil Veterinary Department has been good enough, on more than one occasion when at Aligarh, to visit the Cherat reserve, and report on the management of the dairy cattle. It should be mentioned that a quantity of bone-dust has been supplied to cultivators near Aligarh to experiment with as a manure.

17. **Arboriculture.**—A separate report has this year been submitted on this subject, in accordance with the wishes of the Government of India. The total length of avenues at the beginning of the year was 7,614 miles, to which 185 miles of new avenue were added during the year.

The length of avenues is greater than last year owing to the bringing on the list of many roads with avenues that had previously been omitted. On the first class roads of the provinces three-quarters of the total length are now provided with avenues, on second class roads 36 per cent., 3rd class roads 13 per cent., and 4th class roads 5 per cent. The expenditure on arboriculture amounted to Rs. 72,229, the receipts to Rs. 41,937. The actual cost to Government was Rs. 30,292, as compared with Rs. 34,113 in the year preceding.

The circulars issued from this Department from time to time were revised during the year, and re-issued as a compilation in book form. It is believed that the old circulars issued many years ago had often been lost sight of. The question of translating that part of the Manual which deals with actual tree-planting is under consideration.

## SECTION V.

### Agriculture, including Experimental Farms.

18. **Cawnpore Experimental Farm.**—The results of the year's working have been described in the Annual Report on the farm, to which has been attached a special note by the Agricultural Chemist to the Government of India, who visited the farm on several occasions during the year, and satisfied himself that it had been doing valuable experimental work. In future, experiments will be conducted in communication with and under the advice of the Agricultural Chemist. During the last year no new experiments were undertaken, as it was not considered advisable to make any new departures until Dr. Leather's advice had been obtained. In the kharíf the crops were poor, and were in many cases damaged to such an extent by untimely rain that no conclusions of any value could be drawn from the results. The advantage of early sowings of maize, to which attention has frequently been called, was, however, demonstrated in a striking manner, not only by the outturn on plots specially set apart for this experiment, but by the results of the harvest generally. On some of the experimental plots, where the sowings were late, the young plants were almost entirely ruined by excessive rain, while on others, where the crops had been sown earlier, the yield was in many cases twice as great as in the previous year. The spring harvest was an unusually good one; the crops escaped the attack of rust, which at one time was apprehended: the yield was exceptionally high, and the grain, when threshed, plump and good. The

experiments with foreign wheats and barleys gave as usual unsatisfactory results and will probably be discontinued. Canadian oats gave a magnificent outturn of straw, but a very poor yield of grain, and it does not seem probable that this crop will be of much use except as a fodder; though for that purpose it may prove very valuable.

19. **Private farms.**—There is always some delay in obtaining from the owners of private farms an account of their operations, and as I understand that details are not required in the Annual Report I have not delayed it. Babu Lachman Pershad's Farm near Cawnpore is perhaps the best of the private farms. It is exceedingly interesting as an example of the reclamation of ravine land by terracing and embanking, and his experiments are of a simple and practical description. The value of arboriculture is shown by the planting of trees along the roads of the farm, in the homestead itself, and on waste spaces, where an experiment in forming fuel reserves is being tried. The only other private farm I have been able to visit is the Demonstration Farm near Meerut, which is under the nominal management of Chaudhri Debi Singh, Rai Bahádur, but has really been worked by an official deputed from Cawnpore. During the year it became necessary to recall the actual manager to Cawnpore, and the Farm was much neglected during his absence, and was the reverse of a model when I saw it in August. The manager has now been allowed to go back, but the question of continuing the present arrangements for the conduct of this farm will require to be considered when the period for which they were agreed to expires next year.

20. Chaudhri Said-ud-din Husain continues to maintain his farm near Budaun, and is in frequent correspondence with the Department as to its management. He takes some pains to introduce improved varieties of seed, and shows a decided interest in agricultural matters generally. That there is a growing belief in the possibility of agricultural improvement, and an increasing willingness to give a fair trial to novel methods and appliances, there can, I think, be no doubt. Munshi Muhammad Mir, the gentleman who took the chief part in the unsuccessful, but enterprising attempt to settle cultivators in the Central Provinces, has been in correspondence with the Department about the opening of a private farm in the Meerut district; and assistance for the same purpose has been given to Kunwar Lekhraj Singh, an energetic landlord in Aligarh, whose efforts in another direction—the encouragement of horse-breeding—have already received official recognition. In the Allahabad district the Porter Agricultural Association, under the guidance of Rai Mahábir Prasad Narain Singh Bahádur, continues its efforts for the introduction of improved staples and implements in the southern parganas. The President paid a visit to the Cawnpore Farm during the year to study the system of management and inspect the stock of agricultural implements.

21. **Government Gardens.**—The Horticultural Gardens at Lucknow and the Botanical Gardens at Saháranpur are under the control of this Department, and reports are also received from the Khusru Bágh Garden at Allahabad, the Taj Garden at Agra, and the Motesar Garden, Kumaun, which are under the management of local authorities. The usual visits have been paid to all these gardens except the last named during the year. The Lucknow and Saháranpur gardens are now managed so as practically to recoup the whole of the expenditure on them. The charges of the former amounted to Rs. 15,300, and of the latter (including the Branch Gardens at Mussoorie) to Rs. 20,579. The receipts, exclusive of the value of seeds and plants issued free to Soldiers' Gardens or Public Institutions, were Rs. 13,312 and Rs. 17,384 respectively, though the season was not a favourable one for either garden. The demand for seed and plants from the gardens is increasing, and their influence on horticulture throughout the Provinces is marked. Numerous varieties of foreign fruit trees, vegetables, and flowers have been introduced. The foreign fruits have not generally been very successful; but two varieties of pear from Florida have done well at Saháranpur, and at Lucknow good results have been obtained with improved varieties of pease. An attempt to grow hyacinths at Lucknow, which failed when first made some years ago, has been renewed with success. Funds have been sanctioned for the erection of a new Plant House in the Saháranpur garden, and for the entertainment of a special establishment for ornamental work.

22. One-third of the area of the Khusru Bágh Gardens at Allahabad has been taken up for the water works. The expenditure on the gardens during the year was Rs. 5,000, of which over half was capital outlay on the laying down of water pipes. The receipts were Rs. 2,240. Water has been supplied to the gardens free of charge since November 1892, and it is expected that in future the receipts will almost, if not quite, balance the expenditure. This garden is justly famous for its roses; and the Superintendent has been giving attention to the raising of varieties of selected mangoes.

23. The Committee of the Taj Gardens have four separate gardens near Agra under their control. The services of Mr. Westland, the European gardener, were dispensed with from 1st May, and the post has not yet been permanently filled up. There is no point of special interest in connection with the management in the Annual Report. The Taj Gardens are not self-supporting like those at Lucknow and Saháranpur, nor is it to be desired that too great stress should be laid on their paying their expenses, though the receipts might certainly be increased. The expenditure during the past year was Rs. 19,000, inclusive of a special grant of Rs. 3,000 for improvements. The receipts were Rs. 940.

24. The Superintendent of the Motesar Gardens has called attention to the deterioration of the hill potato, and the necessity of importing fresh supplies for seed purposes. After consulting the Director of the Botanical Department, I have sanctioned from the seed imprest at my disposal the purchase of one and a half tons of tubers of three of the best improved varieties. It is believed that a ready sale for the imported tubers will be found. The receipts of this Garden amounted to Rs. 1,435, as compared with Rs. 1,918 in the preceding year, and the expenditure to Rs. 2,843, as compared with Rs. 2,804.

## SECTION VI.

### Introduction of Agricultural Improvements.

25. **Agricultural Shows.**—Shows are held at Etáwah, Khairabad, Bulandshahr, Aligarh, Muzaffarnagar, Meerut, Muttra, and Rámpur. The Department was represented at the last two by Farm apprentices, and at the others by the permanent or the Officiating Assistant Director. A Cattle Fair was held at Kheri for the first time. A novel feature at several fairs has been the institution of ploughing competitions between mares trained at Babugarh, yoked in improved ploughs, and country bullocks with native ploughs. At Aligarh and Meerut the mares were held to have won, and at Muzaffarnagar the bullocks. Advantage was as usual taken of the fairs to sell improved agricultural implements, and lectures were delivered by the Assistant Directors. A number of implements were also sent to an Agricultural Show at Hydrabad, organized by Mir Muhammad Husain, late Assistant Director in these Provinces.

26. **Distribution and sale of Implements.**—The following statement compares the figures for the last two years:—

| Name of implements. | In the year 1891-92. | | | | In the year 1892-93. | | | | More. | Less. | Remarks. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Sold. | Given on trial. | Given on hire. | Total. | Sold. | Given on trial. | Given on hire. | Total. | | | |
| Ploughs ... ... | 88 | 15 | 19 | 122 | 111 | 2 | 11 | 124 | 2 | ... | |
| Chain pumps ... ... | 17 | 12 | 13 | 42 | 14* | 6 | 6 | 26 | ... | 16 | * Two sold on hire system. |
| Grain kibbling mills ... | 19 | ... | ... | 19 | 12 | 2 | ... | 14 | ... | 5 | |
| Chaff cutters ... ... | 13 | ... | ... | 13 | 8 | 5 | 1 | 14 | 1 | ... | |
| Flour mills ... ... | 1 | ... | ... | 1 | 1 | ... | ... | 1 | ... | ... | |
| Sugar pans ... ... | ... | 1 | 1 | 2 | 1 | ... | ... | 1 | ... | 1 | |
| Dredgers ... ... | ... | 6 | 4 | 10 | 1 | ... | ... | 1 | ... | 9 | |
| Boring apparatus ... | ... | 6 | ... | 6 | ... | 6 | ... | 6 | ... | ... | |
| American hoes ... ... | ... | ... | ... | ... | 2 | ... | ... | 2 | 2 | ... | |
| Baldeo water lift ... | ... | ... | ... | ... | 1 | ... | ... | 1 | 1 | ... | |
| Total ... | 138 | 40 | 37 | 215 | 151 | 21 | 18 | 190 | 6 | 31 | |

There was an increase in the sale of ploughs and chaff cutters and a decrease in the sale of kibblers. The supply of the latter had run out, and the new supply did not arrive till May, when the selling season is over. Two chain pumps were sold on the hire system recommended two years ago by the Government. The steam threshing mill, which the Department has had for some years, was used in threshing the spring crops at the farm, and some of the neighbouring cultivators were glad to have their crops threshed by it. An application for the loan of it next year has been received from a landowner in the Aligarh district. I do not think that this branch of the Department's work can be efficiently supervised until a trained Mechanist is added to the staff. I have been in correspondence with the Principal, Thomason College, Roorki, as to the salary that would be required to secure a good man; but it will evidently be difficult to get a thoroughly competent mechanic on any salary which the Department can at present afford.

27. **Distribution of Seed.**—The following statement compares the quantity distributed in the past two years :—

| Name of seed— | 1891-92. lb. | 1892-93. lb. |
|---|---|---|
| Wheat ... ... ... ... ... | 26,975 | 73,402 |
| Barley ... ... ... ... ... | 200 | 984 |
| Oats ... ... ... ... ... | 6,922 | 6,152 |
| Peas ... ... ... ... ... | 58 | 90 |
| Sorghum ... ... ... ... ... | 484 | 716 |
| Guinea grass ... ... ... ... | 5 | 11½ |
| Lucerne ... ... ... ... ... | 36 | 46½ |
| Mangel ... ... ... ... ... | 17 | 18 |
| Nankin cotton ... ... ... ... | 7 | *Nil.* |
| Turnip ... ... ... ... ... | 1 | 2 |

The increase under wheat is due to an exceptionally large demand for 800 maunds of Muzaffarnagar wheat for Burma. A small amount was also sent to the Panjáb; within the provinces the largest quantity sent out was to Bánda. The demand for oats is increasing, and a larger quantity could be supplied if all indents were met, but attempts are made to restrict the supply to indents for oats as seed. Supplies have been sent in the year under report amongst other places to Nagpur and Jodhpur. The demand for *sorghum saccharatum*, guinea grass, and lucerne has also increased.

28. **The Agricultural Association.**—I was unable during the cold weather to arrange for any general meeting of the Agricultural Association. It was proposed to have a meeting in the rainy season, but after correspondence with some of the members, the plan was given up on account of the inconvenience likely to be caused. The Provincial Association is too unwieldy to be easily brought together except on very special occasions, and I have been unable to do more than interview members on my tours. In many districts Local Committees have been formed; but except where some such persons as the gentlemen mentioned in paragraphs 19 and 20, take the lead, they show small power of initiative. The organisation of these Local Committees and the keeping them in communication with each other and with the Department, are tasks in which considerable assistance may be looked for from the Assistant Director, as his acquaintance with the province extends. The Department still relies for its information as to the condition of the crops on reports received from private individuals, many of whom are members of the Association: but to ensure punctuality and regularity, it may become necessary to supplement the private bulletins by official reports.

29. **The Agricultural Journal.**—The number of subscribers fell off from 393 to 380. With reference to the orders of Government on last year's report, arrangements are being made to issue an abridged edition of the Journal in Hindi. The experiment of issuing the Journal in both Urdu and Hindi was tried in 1888, but as the number of subscribers to the Hindi edition never exceeded 26, it was discontinued. The total receipts from subscribers amounted to Rs. 213, and the expenditure was Rs. 492. A series of interesting articles on agricultural subjects was contributed by Saiyid Ali Husain, the Manager of the Farm, and amongst the other articles may be mentioned

a comprehensive note on ensilage, with full but simple instructions for the making of silos, drawn up by the Assistant Director.

30. **Boring apparatus.**—The two well-sinkers employed by the Department made 40 experimental borings in districts of the Meerut Division during the year, and appear from the reports of the landowners employing them to have generally given satisfaction.

## SECTION VII.

### Registration of Traffic,

31. **Foreign Traffic.**—The registration of the foreign trade of the country with Thibet and Nepal shows a great falling off in the import of timber from Nepal. The decrease is most noticeable in the Gorakhpur district, and is attributed partly to exhaustion of the forests, partly to restrictions on trade imposed by Nepalese officials. With this exception there are no important variations in the trade of the past year as compared with the preceding.

32. **Rail-borne traffic.**—The rail-borne traffic registered during the year compares as follows with the trade of the previous year :—

| | *Imports.* | | *Exports.* | |
|---|---|---|---|---|
| | 1891-92. | 1892-93. | 1891-92. | 1892-93. |
| Amount, mds. ... ... ... ... | 2,33,09,139 | 2,17,87,066 | 3,15,67,664 | 3,50,89,984 |
| Value Rs. ... ... ... ... | 12,80,12,517 | 12,60,70,898 | 17,67,44,723 | 18,60,68,933 |

The statistics of the trade show a marked improvement in the agricultural resources of the Provinces owing to a succession of favourable seasons. The unprecedented export of wheat, which followed the excellent harvest of 1891, and was stimulated by the failure of crops in Europe, continued during the first quarter of the year under report. In the fifteen months from April 1891 to June 1892, the exports of wheat equalled one-third of the total quantity exported in the previous ten years. The wheat crop of 1892 to some extent disappointed the expectations formed of it, and after June 1892 the exports fell off, and the trade has not since revived on the old scale. The total exports of wheat in 1891-92 were 99,08,142 maunds, and in 1892-93 82,51,464 maunds, as compared with an average of 48,54,249 maunds in the ten years preceding. Under the head of grains other than wheat, there was a net export of 62,82,029 maunds, as compared with a net import of 59,402 maunds in the preceding year. The exports of other agricultural produce also increased; exports of oilseeds and *ghi* were greater both in quantity and value; the exports of indigo were slightly less in quantity, but of much greater value owing to a rise in price; while exports of sugar, for the opposite reason, though greater in quantity, were of less value. The decrease in imports is due to the much smaller import of food grains; the imports of metals, cotton goods, and salt increased considerably.

33. The statistics have been reviewed in the Annual Trade Report, and need not be again given in detail. To appreciate the improvement in the position of the Provinces caused by a series of favourable seasons, it is necessary to compare the figures of the past year with those of 1890-91, when poor harvests had reduced the food stocks below the requirements of the population. In that year there was a small net export of wheat, but other food grains had to be largely imported, and the amount by which the total value of food grains imported exceeded the exports was (taking the rupee at 1*s.* 4*d.*) £4,34,885. In 1892-93 the value of the exports of food grains exceeded the value of the quantity imported by £2,584,662.

34. **Road and River Traffic.**—In connection with the arrangements for reviewing the resources and ascertaining the amount and direction of internal traffic in the different tracts of the Provinces, a system of registration posts was maintained in the districts of Rae Bareli, Partábgarh, Sultánpur, Fyzabad, Jaunpur, Azamgarh, Gházipur,

and Ballia, which were originally selected on account of proposed railway extensions. The year under report was the second in which the trade in these districts was registered. The first year was altogether abnormal owing to failure of harvests in some of the districts, and the posts are therefore being maintained for a third year in order to the formation of a correct estimate of the resources of these tracts in average seasons. The statistics of the past year show a satisfactory increase in the exports of grain, much of which was intended for Bengal, and of other agricultural produce. The change in the trade caused by favourable seasons is most noticeable in the case of Azamgarh, which in the preceding year was obliged, owing to failure of the harvests, to import food grains largely, and in the year under report was able to diminish its imports considerably and to increase its exports.

35. In reviewing last year's report the Government asked whether the export of wheat was leading to a change in the staple food of the people. The enquiries made on the subject have proceeded sufficiently far to show how difficult it will be to get any positive information and how contradictory are the opinions held by the people themselves as to the effect of export. The statistics of trade of the last three years, however, show conclusively, in my opinion, that the great export of wheat in 1891-92 did not constitute a serious drain on the food supplies of the people, and that there is no reason to suppose that they were induced by the prospect of pecuniary profit to diminish their supplies unduly. In 1890-91 the net exports of wheat were unusually low—only 14,000 tons. In 1891-92 they were unusually high —3,57,000 tons—but the exceptionally large difference between these figures, 3,43,000 tons, is much less than the difference between a good and a bad harvest. In 1890 the outturn of the wheat harvest was estimated at 14,58,000 tons, and in 1891 at 17,45,000. The difference of the estimates, 2,87,000, is not quite so large as the difference between the net exports of wheat in the two years, but the outturn of the 1891 harvest was probably under-estimated, and the poor harvest of 1890 followed a still poorer one in 1889. The largest estimate made in recent years of the outturn of the wheat crop was 20,96,000 tons in 1885, the lowest was 14,40,000 tons in 1889; the difference between these, 6,56,000, far exceeds the exceptionally large difference between the export trade of 1890-91 and that of 1892-93. The effect of the greatest expansion of export yet known is therefore small compared with the difference between a good and a bad season.

36. If figures were required to show that the export of wheat necessitated the import of other grains to make up for the drain on food supplies, it would be necessary to have recourse to the statistics of 1890-91 when wheat exports were at their lowest. In that year the net import of rice and other grains was 1,77,000 tons; in the next year, when the exports of wheat had so largely increased, the net imports of other grains were only 2,000 tons; and in 1892-93, though the export of wheat continued on a large scale, the Provinces were able, owing to good harvests, to export rice, millets, pulses, and other food grains in far larger quantities than before, and to import less. The export of these grains in that year exceeded the import by 230,111 tons.

It is unnecessary to discuss what the possible effect of a great development of the export trade might be in theory. The figures now given negative any supposition that the people have been induced by the high price obtainable for wheat in recent years to send it out of the country when it should have been retained for their own consumption. They have merely exported surplus produce that they could well spare.

37. It may also be noticed that notwithstanding the high export of wheat in the last two years, the average exports in the last seven are actually lower than in the five years preceding. From 1881-82 to 1885-86 inclusive, the average annual exports were 2,23,000 tons: from 1886-87 to 1892-93 they were only 1,90,000 tons. The Provinces have therefore been in recent years exporting less wheat and not more than they formerly did; and there is nothing in the history of recent years to give any ground for supposing that their trade organization is so defective, and their traders so wanting in knowledge and foresight, as to encourage export of grain that ought to be retained for consumption in the country.

## SECTION VIII.

### Promotion of Horse-breeding operations through Civil Agency.

38. These operations are under the supervision of the Superintendent, Civil Veterinary Department, who has submitted two separate reports—one on the Military and one on the Civil Section of his work. During the year under report the Superintendent's time was chiefly occupied with the Military branch of his work, but since the new Department has been organized, he has been relieved of the charge of supervising Military Horse-breeding operations in Rájputána and the Delhi Division of the Panjáb. Notwithstanding this transfer, the Military or Imperial Work of the Department will probably, for some time to come, occupy the greater part of his time, as the operations conducted by Civil Agency will take some time to develope. As the Local Boards in these Provinces have no separate funds of their own, the expense of any extension of Horse-breeding operations falls directly on the Government, except when assistance can be obtained from municipalities or from private persons. During the year ending 31st March 1893, a sum of Rs. 7,000 was allotted by Government, with which 17 stallions have been purchased. These have for the most part been allotted to the western districts in which an interest in horse-breeding has been already established; but two have been issued as an experimental measure to districts in Oudh. The stallions are considered a good lot by the Superintendent, and there appears to be considerable demand for their services, but the next report must be awaited for details of the results. The expense of the stallions is met by a grant from Government, which is given after a guarantee has been obtained that subscriptions to the extent of one-third of the amount required for keep will be made locally. For the present no fees are charged. Except in the Aligarh district, where eight stallions have been purchased outright by landowners, little assistance has been received as yet from private persons. The District Board of Etáwah have had a stallion for some time, and another, which has been doing good work, is kept at the Government Farm, Cawnpore. One Municipal Board, namely that of Firozabad, in the Agra district, has purchased a stallion.

39. A separate report on Mule-breeding has been submitted by the Superintendent, who hopes to be able to issue a few donkey sires, for which sixteen applications have been registered, next cold weather. For the coming year the grant made to the Superintendent has been increased with a special view to the purchase of donkey sires for the encouragement of Mule-breeding.

40. The Superintendent attended the Fairs at Garhmukteswar, Batesar, Etáwah, Aligarh, Bulandshahr, Nauchandi, and Muzaffarnagar.

41. Amongst the measures which this Department was desired to take in connection with the operations of the Civil Veterinary Department was the encouragement of Managers of Court of Wards Estates to try the experiment of using brood mares in the plough. In the Meerut Division, however, where horse-breeding operations are most fully developed, there are no estates where the experiment can conveniently be made, and it has not been possible as yet to induce the Managers of estates elsewhere to make the trial. A pair of pony mares have therefore been purchased for the Government Farm at Cawnpore, and have been broken in to the plough very easily and very successfully.

42. Owing to the absence of any arrangements for giving veterinary instruction in these Provinces, great difficulty has been found in obtaining the services of qualified district salutris, and proposals have been made for the establishment of a Veterinary School at some centre in the Provinces, probably at Lucknow.

43. The Superintendent has been requested to take steps to carry out the instructions of the Government of India regarding the preparation of a conspectus of diseases to which animals in India are liable. The progress made will be noted in future reports.

## SECTION IX.

### MISCELLANEOUS.

44. **Dairies and dairy-farming.**—The employment of Mr. Keventer, the dairy expert, has been fully dealt with in a separate report. The dairy at Aligarh was kept in working order during the whole of the year, and the supply of butter rose to 2,211lb. in the month of March. In October the Government sanctioned an advance of Rs. 7,500 for the opening of a dairy at Lucknow, to be worked in connection with the Jail, and during the greater part of the cold weather Mr. Keventer was engaged in organizing the new dairy under the orders of the Superintendent and of the Inspector-General of Prisons, who took the greatest interest in its success. At first customers were obtained slowly for the new dairy; but before it was finally made over to the Jail Department in April, the demand exceeded the supply, and I understand that it is still unable to meet all the demands made. During the absence of the expert from Aligarh, the dairy there was put under the management of an employé of this Department, whom he had trained, and when Mr. Keventer left for Europe in April, it was decided to continue the dairy under this man's supervision. It had originally been intended to contract operations at Aligarh, as it was thought that the opening of the Lucknow Dairy would lower the demand; and it was with some hesitation that I finally decided that it should be kept in full working order. But the demand, instead of decreasing, was much larger than in the previous hot weather, and the contraction of operations seemed likely to be productive of some public inconvenience. It was, therefore, decided to let the native Superintendent, whose management in Mr. Keventer's absence had been very favourably reported on by him, conduct the dairy on the old footing. From frequent visits paid to the dairy and from a perusal of its correspondence, I consider that he has managed it with very considerable success. Butter was in great demand during the hot weather in many stations in the plains and was regularly supplied all through the season to Naini Tal and Mussoorie. Occasional complaints have been made that the butter is not quite so good as formerly, and it would not be surprising if this were the case; but it is creditable to the native manager and to Mr. Keventer's tuition that a much larger business than in the previous hot weather should have been managed without serious hitch or complaint. Mr. Keventer is expected to arrive again in India shortly, and a recommendation has been made that his services should be retained for another year in these Provinces. A new dairy house has been built at Cherat, and a road has been made to connect it with the main road, from which it was formerly approached only by a footpath.

45. **The Agricultural School.**—The teacher engaged from Madras for the Agricultural School, the opening of which was recommended by the Technical Education Committee, arrived in December and was employed during the following months in familiarizing himself with the agriculture of these Provinces, in preparing a syllabus of the School course, and in lecturing to such students of the kanúngo class as were sufficiently acquainted with English to follow lectures in that language with advantage. Plans for a school house were also prepared, but the building of a school was deferred owing to a representation by the Talúkdárs of Oudh in favour of the establishment of the School at Lucknow. It was finally decided that the School should be experimentally opened at Cawnpore in the building hitherto occupied by the statistical section of the Department, which was transferred to Lucknow. The concentration of the offices of the Department in one place is in itself a great advantage; and the transfer to Lucknow was effected without any very great inconvenience, though an increase in the accommodation there is desirable, and will in time be necessary. In July the school was opened; and notwithstanding the absence of suitable boarding accommodation, the class rapidly filled, and there were at the end of the year twenty students, of whom fifteen were candidates for kanúngoships and five for teacherships. Those men of the first class who pass the examination will have a preferential claim to kanúngoships in their own districts; and the necessity of giving men who are to hold these posts a better education, and of directing their attention more than at present to agricultural

matters, would in itself sufficiently justify the maintenance of the School. There are as yet no independent students; nor is it desirable that they should come until the boarding house is completed. The building intended for this purpose is now nearly ready, and will serve admirably for 18 or if necessary for 24 students. Of the students seven are Brahmans, seven Kayasths, four Muhammadans, one Rájput, and one Baniya. Several belong to landowning families, and one, the son of a tahsíldár, to a well known Muhammadan family of Moradabad. As a rule they have relations in Government service, and there is no doubt that their main object, with perhaps one exception, is to qualify for state employment, but in this there is nothing surprising. The course of study includes Agriculture, Physiography, Chemistry, Botany, and Surveying. In the second year's course arrangements will be made for the cultivation of plots of land by the students themselves. At present all the arrangements are of a tentative and experimental character; and it has not yet been definitely decided what place the school is to take in the educational system of the Provinces. Students who have passed the Middle English Examination are admitted at present, but I think that in a year or two we shall be in a position to make the passing of the Entrance or School Final Examination the test of admission. Seven of the present students have passed the Entrance Examination. The Principal of the School, Mr. P. V. Subbiah, from the Saidapet College in Madras, has entered into his work with much energy and enthusiasm, and I consider that despite a number of drawbacks, the school has made a very fair start. Should students be ready to join in equal numbers next year, the question of extending the boarding house will require to be considered. Copies of the syllabus for the first year, the rules and instructions circulated for information of intending applicants, are attached as an appendix to this report. The school is on a very small scale, but its opening is important as a recognition of the necessity of giving subjects connected with agriculture a more prominent place than before in our educational system.

46. **The Lucknow Museum.**—Owing to the repairs and improvements that are being carried out to provide a much needed increase of accommodation there has been some temporary disarrangement of the collections of exhibits. The new rooms will shortly, it is hoped, be ready, and will provide space for the suitable arrangement of the exhibits of the Economic section. The additions to the Museum during the year have chiefly been in the Zoological and Numismatic sections and in the Library. The grant for the Library was increased by a transfer from the allotment for purchase of specimens. When the new buildings are finished I hope that the Committee will be able to spend the whole of the grant allowed for the purpose in completing the collection of specimens illustrative of the arts and industries of the Provinces. If further accommodation is at any time required for future extensions of the Museum, space for some of the exhibits might be found in the building in which the offices of this Department are situated, if a separate Court house could be built for the Civil Court, which is now held there. The expenditure on the Museum was Rs. 11,739, and the receipts Rs. 1,481. The number of visitors was 166,349.

47. **Tea shops.**—Some years ago the Department gave assistance in the establishment of tea shops in a few of the large towns in the Provinces, and when experience had shown that a fair degree of commercial success might be expected, an advance of Rs. 2,000 was sanctioned to two native gentlemen of Lucknow and Bara Banki, to enable them to push the trade (paragraph 43 of the Annual Report of the Department for 1886-87). The advance has been repaid this year. One of the grantees reports that he has established numerous tea shops: and whether this is correct or not, it is a matter of common knowledge that the use of tea in the cold weather is increasing, and that facilities for obtaining it have been brought within the reach of the inhabitants of all large cities. I am informed that the number of tea shops in Lucknow has considerably increased; and that they are usually to be found and are most freely resorted to in the neighbourhood of opium shops, but I have not personally verified this information.

48. **Specification of inventions.**—15 cases were reported on to the Government during the year. The want of a competent and educated mechanician is much felt in dealing with some of the applications for patents for agricultural machines.

49. **General.**—The Assistant Director, Mir Muhammad Hadi, was severely handicapped by illness during the first part of the year under report; and has not yet sufficiently mastered the work of the Department to give as much assistance as may be expected in time from an assistant of his training and natural abilities. The Personal Assistant, Babu Lachman Parshad, has been specially chosen for the difficult and responsible work of preparing the pargana book in its new form. The departmental work done by him deserves the same high commendation as in previous years.

I have the honor to be,

SIR,

Your most obedient servant,

J. O. MILLER,

*Director.*

# APPENDICES.

# APPENDIX A.

*Memorandum showing the Expenditure and Receipts of the Department of Land Records and Agriculture, North-Western Provinces and Oudh, for the Financial year* 1892-93.

| Heads of charges. | Budgetted allotment. | Actual expenditure. | Saving on budgetted expenditure. | Receipts paid into Treasury. | Budgetted receipts. | Remarks. |
|---|---|---|---|---|---|---|
| | Rs. a. p. | Rs. a. p. | Rs. a. p. | Rs. a. p. | Rs. a. p. | |
| Gazetted Officers' travelling allowance ... | 3,750 0 0 | 3,159 8 0 | 590 8 0 | ... | ... | (*a*) Budget grant for 1892-93 was Rs. 1,400; Rs. 400 were subsequently sanctioned, *vide* G. O. No. $\frac{440}{X-B-61}$, dated 27th January 1893. |
| Office Establishment ... ... ... | 24,504 0 0 | 24,082 7 4 | 421 8 8 | ... | ... | |
| Ministerial Officers' travelling allowance ... | 2,000 0 0 | 1,984 0 3 | 15 15 9 | ... | ... | |
| Kanúngo Inspector's Establishment ... | 5,500 0 0 | 5,386 10 8 | 113 5 4 | ... | ... | |
| Ditto travelling allowance ... | (*a*) 1,800 0 0 | 1,794 15 6 | 5 0 6 | ... | ... | |
| Office contingencies ... ... ... | (*b*) 6,572 15 9 | 6,572 15 9 | ... | ... | ... | (*b*) Budget grant for 1892-93 was Rs. 6,402; Rs. 170-15-9 were subsequently sanctioned, *vide* G. O. No. $\frac{3119}{X-B-61}$, dated 19th June 1893. |
| Traffic Registration contingencies ... ... | 19,000 0 0 | 16,766 15 4 | 2,233 0 8 | 1 10 0 | ... | |
| Cawnpore Experimental Station Establishment ... | 4,056 0 0 | 4,052 14 10 | 3 1 2 | ... | ... | |
| Ditto ditto Contingencies ... | 9,544 0 0 | 7,871 10 5 | 1,672 5 7 | 4,728 2 0 | 3,500 0 0 | |
| Cawnpore Workshop Contingencies ... ... | 6,000 0 0 | 1,086 6 6 | 4,913 9 6 | 2,499 7 3 | 4,000 0 0 | (*c*) Budget grant for 1892-93 was Rs. 900; Rs. 1,481-15-0 were subsequently sanctioned, *vide* G. O. Nos. $\frac{772}{X-B-61}$, dated 15th February and $\frac{1183}{X-B-61}$, dated 9th March 1893. |
| Well Experiment ... ... ... | 1,000 0 0 | 80 6 0 | 919 10 0 | 12,493 2 0 | ... | |
| Gházipur Stud Farm ... ... ... | ... | ... | ... | 3,386 6 3 | 1,500 0 0 | |
| Reclamation of waste lands ... ... | 5,400 0 0 | 5,400 0 0 | ... | ... | ... | |
| Dairy Experiments ... ... ... | (*c*) 2,381 15 0 | 2,318 11 0 | 63 4 0 | ... | ... | |
| Miscellaneous Experiments ... ... | 700 0 0 | 687 15 0 | 12 1 0 | ... | ... | |
| Agricultural Shows ... ... ... | 630 0 0 | 265 7 0 | 364 9 0 | ... | ... | (*d*) Budget grant for 1892-93 was Rs. 500; Rs. 496-14-3 were subsequently sanctioned in G. O. No. $\frac{3289}{X-B-61}$, dated 29th June 1893. |
| Breeding Bull and Stallion charges ... ... | 2,900 0 0 | 2,791 7 0 | 108 9 0 | 123 5 9 | 300 0 0 | |
| Imperial Institute, London ... ... | (*d*) 996 14 3 | 996 14 3 | ... | ... | ... | |
| Cawnpore Kanúngo Survey School Establishment | 600 0 0 | 500 0 0 | 100 0 0 | ... | ... | |
| Ditto ditto Contingencies | (*e*) 161 2 4 | 161 2 4 | ... | ... | ... | (*e*) Budget grant for 1892-93 was Rs. 150; Rs. 11-2-4 were subsequently sanctioned, *vide* G. O. No. $\frac{3202}{X-B-61}$, dated 27th June 1893. |
| Miscellaneous ... ... ... | ... | ... | ... | 327 9 6 | ... | |
| Total ... | 97,496 15 4 | 85,960 7 2 | 11,536 8 2 | 23,559 10 9 | 9,300 0 0 | |

Certified that the receipts in this office were checked in the manner prescribed in G. O. No. 34, dated 5th October 1882.

J. O. MILLER,

*Director of Land Records and Agriculture, N.-W. P. & Oudh.*

## APPENDIX B.

### AGRICULTURAL SCHOOL, CAWNPORE.

## SYLLABUS FOR THE FIRST YEAR'S COURSE.

### No. 1.—Agriculture.

*General.*—The history, objects, and scope of agriculture and the conditions influencing its pursuit. The climate and seasons of India in general and the North-Western Provinces and Oudh in particular.

*Soils.*—Formation. Physical characters. Fertility and barrenness. The reclamation of waste land and its preparation for cultivation. Improvement of soils. The sub-soil. Salt land, its formation and improvement.

*Tillage.*—Objects of tillage. Deep and shallow tillage. Ploughing, grubbing, sub-soiling, harrowing, ridging and rolling. Implements and tools used in tillage and seed-sowing. After-cultivation. The names and characters of the principal weeds.

*Manuring.*—Treatment and application of farm manures. Green manuring. Use of special manures, *e.g.*, oil cakes, saltpetre, bones, lime, woollen refuse, &c. Top-dressing.

*Irrigation.*—Economy, use and application of water. Waterlifts in common use. Origin of springs. Well-sinking. Irrigation from tanks and canals.

*Crops.*—Rotations and mixed cropping. Fallowing. Seed sowing. Seeds, germination and conditions favourable for germination. Pedigree influence. Collecting seed. Change of seed. Thick and thin sowing. Shallow and deep sowing. Testing seed. Dressing seed. Transplanting. Principal cereal, pulse and industrial crops, *e.g.*, wheat, barley, oats, juár, bájra, maize, rice, gram, múng, úrd, sugarcane, cotton, indigo, and poppy.

*Stock.*—Breeding, care and management of cattle and sheep. Breeds of the North-Western Provinces and Oudh. Dairying.

*Pasture land and its treatment.*—Green fodder. Raising of fodder crops. Hay-making and silage. Storage of fodder.

*Fruit and vegetable growing.*

*Text-book.*—*The First Book of Agriculture*, by C. Benson and C. K. Subba Row, will be used for the present. (*Price annas* 3 *and* 6 *pies.*)

### No. 2.—Physiography.

1. *The earth.*—Its shape and measurement; distribution of land and water; gravitation; causes of day and night; alternation of seasons; movements of the earth; maps; the compass; latitude and longitude.

2. *The atmosphere.*—Air: its composition; the effects of heat, wind, water vapour, clouds, rain, hail, snow, dew, fog, the monsoons, storms, cyclones; the use of the barometer, thermometer, and rain gauge.

3. *The ocean.*—Extent, depth; composition of sea water.

4. *Features of the earth and their changes.*—Continents; islands; mountains; volcanoes; rivers; river deltas; watersheds and water-parting; lakes; physical action of rivers; glacier action; erosion of valleys; floods; earthquakes.

5. *Composition of the earth.*—Rocks, their decomposition and denudation, with a very general account of the formation and distribution of soils. Soils; clay; sand; loam. Metals; coal; salt.

6. *Land and its tenants.*—Effects of temperature; the tropics; effects of rainfall; other causes of variation of climate; distribution of man and higher animals.

*Text-book.—Physical Geography Primer* by Geikie. (*Price annas* 10.)

No. 3.—Chemistry.

No special syllabus required. The arrangement in Professor Roscoe's Chemistry in the Science Primer Series will be followed throughout. (*Price of the Primer, annas* 10.)

No. 4.—Botany.

(*Vegetable Chemistry.*—Air, water, carbonic acid, ammonia, starch, cellulose, sugar, albuminoids, ash of plants.)

Nature of the cell and its constituents. Internal structure of the exogenous, endogenous and ærogenous stem.

Morphology of the angiospermous flowering plants.

Functions of the root, stem and leaves; absorption, transpiration, assimilation and respiration.

Fertilisation, adaptation for cross-fertilization, germination.

Influence of light on plants.

Development of heat by plants.

Movements of plants.

Carnivorous plants.

Special attention should be paid to the following:—

Mustard; cotton; flax; orange; mango; indigo; varieties of spring and autumn pulses; ground nut; tamarind; Inga dulcis; guava; the common gourds; safflower; brinjál; tobacco; chillies; the cabbage tribe; hemp; castor oil; betel; ginger; turmeric; plantain; aloe and onion; wheat; barley; oats; dúb grass; bamboo; varieties of millets; sugarcane; and fern.

*Text-book.—Science Primer* by Hooker (with Indian plants for examples in illustration.) (*Price annas* 10.)

No. 5.—Surveying (Theory and Practice).

Surveying with the chain and with the plane-table; plotting to scale; various scales in use in the Provinces; calculation of areas by mensuration and by area comb.

Those of the students who are candidates for kanúngoships will be required to devote more attention to this subject than others, especially to practical map work; and will be required to pass a special examination along with the ordinary kanúngo class. Such candidates will also be required to attend lectures and to pass examinations in the other subjects prescribed for kanúngos.

## AGRICULTURAL SCHOOL, CAWNPORE.

Rules laid down by Government.

The Agricultural School, Cawnpore, is placed under the control of the Director of Land Records and Agriculture. The Director of Public Instruction is appointed Visitor on behalf of Government. He will inspect the school from time to time, will advise the Director of Land Records and Agriculture regarding it, and report to Government on its progress. He may delegate the duty of inspection to the Inspector of the Circle.

2. The school building and fields for practical instruction in agriculture are situated on land forming part of the Government Experimental Farm, which is also made available for practical instruction in agriculture.

3. The full course of study occupies two years. But students who are unable to take up the full course will, if sufficient cause be shown, be admitted for a shorter term, and will receive instruction adapted, so far as may be practicable, to their requirements. The school year commences on the 15th June, and consists of two sessions:—

15th June to 15th December;

15th January to 30th April.

4. Candidates will, for the present, be admitted to the school who have passed the English Middle Examination. But when a School Final Examination shall have been introduced by the University, admission will, as far as possible, be restricted to candidates who have passed the compulsory subjects of that examination. No person will be admitted who is physically unfit for practical work, or (unless admitted for special reasons) who is under 16 years or over 21 years of age. The condition as to age will be less strictly enforced in the case of candidates for admission falling under clause (*a*) of rule 5.

5. The school is for the instruction of—

(*a*) sons of landowners and agriculturists who wish to fit themselves for agriculture or estate management;

(*b*) persons wishing to qualify as teachers of agriculture in State schools;

(*c*) candidates for kanúngoships and other revenue appointments.

6. Students belonging to class (*b*) will be required to pass at the end of their course the School Final Examination in Agriculture.

7. Students belonging to class (*c*) will be admitted on the nomination of Collectors of districts to the number of 15 in each year. They will receive instruction and be examined in the special duties of kanúngos in addition to the prescribed agricultural course. On obtaining the school certificate of agriculture and the kanúngo's certificate, they will have a preferential claim to a kanúngo appointment in their respective districts over passed candidates or kanúngo apprentices on the district list.

8. Applications for admission must be submitted in writing to the Principal before the 15th May, stating qualifications.

9. No tuition fee will at present be charged, but students must make their own arrangements for boarding, unless they are permitted to occupy quarters in the boarding house attached to the school.

*10. There are no special scholarships at present for the school.

11. The course of study comprises—

Agriculture (theory and practice);
Surveying (theory and practice);
Chemistry (theoretical and practical);
Botany;
Elementary Veterinary } omitted for present;
Drawing }

† Duties of kanúngos (for candidates for kanúngoships).

12. The text-books will be prescribed by the Director of Land Records and Agriculture.

13. Attendance at lectures, in the laboratory, and at practical work in the fields, is necessary. Irregularity of attendance disqualifies a student from appearing at the examinations.

14. To ensure that the students acquire a practical knowledge of agriculture, plots of land are allotted to them which they are required to cultivate with their own hands. They are permitted to keep the produce. The students also maintain a labour journal and cultivation book for the experiments conducted on the Experimental Farm.

15. The course of instruction in surveying largely consists of practical work with the plane-table and chain.

16. A small veterinary dispensary will eventually be attached to the class for practical instruction in the treatment of the more common forms of cattle disease.

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* The Government have since sanctioned four scholarships of Rs. 5 per month each.

† A course of general lectures on Physiography has been added (*vide* Syllabus).

17. At the end of the first year an examination is held to qualify for admission to the second year's course. Students who fail may be allowed, for special reasons, to remain in the school, but must recommence the first year's course.

18. A final examination is held at the end of the second year, and certificates given to those who pass. Students will be urged to appear also in the subjects of Agriculture, Chemistry, or Botany in the School Final Examination.

19. Any student found incapable, through laziness or otherwise, to keep up with the lectures and practical work is liable to be dismissed at any time by the Principal.

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**Information for intending applicants for admission to the Agricultural School, Cawnpore.**

1. The school terms will be from 15th June to 15th December and from 15th January to 30th April.

[NOTE.—In the present year owing to unavoidable delay in making the arrangements the first term will not commence before the 1st of July, and the exact date will be communicated to applicants for admission hereafter.]

2. The persons to be admitted are—

(*a*) sons of landowners and agriculturists;

(*b*) persons wishing to qualify as teachers of agriculture;

(*c*) candidates for kanúngoships.

3. All candidates for admission—

(1) must have passed the English Middle Examination;

(2) must be of good physique;

(3) must be over 16 and under 21 years of age, unless admitted for special reasons.

4. Applications for admission should give the following information:—

Name.

Father's name.

Father's occupation.

Caste.

Age.

Date of passing English Middle Examination.

Whether accommodation is desired in the boarding house or not.

Remarks.

(The physical fitness of the applicant should be certified to by some person of position in the district.)

5. Applications from sons of agriculturists or from persons desiring to qualify as agricultural teachers may be made direct to the Principal, or may be forwarded through the District Officer. Ordinarily, applications should be made before May 15th. In the present year they will be received up to the end of June.

6. Applications from candidates for kanúngoships *must* be forwarded through the District Officer. It is essential to keep such applicants distinct from others, as under the orders of Government only 15 may be admitted. A printed form for such applicants only is attached. Other applications may be sent in manuscript.

7. Four scholarships of Rs. 5 per month each have been sanctioned by Government, and will be allotted on a consideration of the qualifications and circumstances of applicants for admission, as shown by any remarks that may be made by District Officers or head masters of schools on the applications.

8. Arrangements will be made to accommodate from 12 to 15 boarders in buildings on the Farm. There is no difficulty in obtaining accommodation in Nawábganj, an adjoining suburb of Cawnpore.

9. The attention of candidates for kanúngoships is called to rule No. 7, which gives passed students of the school a preferential claim to appointments over other candidates in the district. Further proposals to encourage the attendance of candidates for kanúngoships have been made, but have not yet been sanctioned.

10. Any other information may be obtained on application to

THE PRINCIPAL, AGRICULTURAL SCHOOL,
GOVERNMENT FARM, CAWNPORE.

## AGRICULTURAL SCHOOL, CAWNPORE.

*Form of Application for Applicants who are Candidates for Kanúngoships.*

| Name. | Father's name. | Father's occupation. | Caste. | Age. | Date of passing English Middle Examination. | Whether, if admitted, accommodation is desired in the boarding house or not. | Remarks as to physical fitness, circumstances, and qualifications of the applicant. |
|---|---|---|---|---|---|---|---|
| | | | | | | | |

# ORDERS OF GOVERNMENT.

No. $\frac{1002}{\frac{I-36B}{12}}$ OF 1894.

FROM

THE CHIEF SECRETARY TO GOVERNMENT,

N.-W. PROVINCES AND OUDH,

To

THE DIRECTOR OF LAND RECORDS AND AGRICULTURE,

N.-W. PROVINCES AND OUDH.

DATED NAINI TAL, THE 23RD APRIL 1894.

SIR,

I AM directed to acknowledge the receipt of your letter No. $\frac{154}{VIII-1}$, dated 1st November 1893, submitting the report on the operations of the Agricultural Department for the year ending 30th September 1893.

2. In accordance with the orders of the Government of India, communicated on the preceding year's report, the part relating to land records has been expanded to show the work done by yourself and the officers of the Department, and the subject of arboriculture has been dealt with in a separate report.

3. The report submitted to Government deals more particularly with the agricultural portion of the functions of the Department, but your *resumé* necessarily includes a brief account of what has been done in the other branches as well. You remark that the duty of reporting on districts where settlement operations are impending has interfered with your systematic inspection of kánúngos and patwáris' work throughout the province. It is to such districts however that your special attention should be devoted. It is the policy of Government that in future the land records should be revised in anticipation of settlement by the Land Record agency, and not by a special agency engaged at the time of settlement by the Settlement Officer. The details of the scheme are being worked out in consultation with the Board of Revenue.

4. You notice in paragraph 4 of the report the desirability of securing a better class of men for the post of kánúngo. Failure in this respect is attributed to the uncertainty of promotion, and it is suggested that a certain number of naib tahsíldárships should be reserved annually for kánúngos. The Board of Revenue have recently directed that in each division every fifth appointment should be given to a kánúngo. Even without any reservation of posts it is believed that the best men among the kánúngos seldom fail to be selected as naib tahsíldárs. It must be remembered that the office of naib tahsíldár is intended to be the first step on the ladder of the Provincial Service, and that only such men should be appointed as are likely to rise in the service and become efficient tahsíldárs.

5. The section headed "Measures of protection" deals with the experiments that have been made under the superintendence of the Department for the reclamation of usar land. There are now three plots of usar land under experiment, that at Amramau having been disposed of. In the Cherat plot cultivation, which was found so successful at Amramau, was introduced from the year 1890, and the area under the plough in the year dealt with in the report was 86 acres, an increase of 10 acres on the preceding year. The silage made in 1891-92 at Cherat has proved to be excellent, and is readily eaten by cattle. At Gursikran 106 acres have been brought under the plough. In the Juhi plot cultivation has not been introduced, and the experiments are confined to the sowing and planting of grasses and trees and their protection by enclosure. A great part of the Juhi reserve could now be successfully cultivated, but in your opinion it is more important to ascertain the possibility of utilising usar lands for provision of fodder and fuel. According to the appendix to the report the expenditure on reclamation of waste lands amounted to Rs. 5,400 and the receipts to Rs. 3,386. The total expenditure on the three plots is now Rs. 30,481 and receipts Rs. 10,570.

6. It has been proved at Amramau that usar land can be reclaimed by enclosure followed by deep ploughing and manuring, and it will be interesting to watch the progress of the Amramau plot, which after being under the charge of the department for a period of 11 years was sold for Rs. 2,050, in order to see whether the care and labour expended in its reclamation is to be rewarded by permanent results, or whether there is any tendency in it to again develop reh and return to its former condition of a sterile waste. This experiment need not be repeated: the villagers are sufficiently ready to break up waste land if they find that their outlay in bringing it under cultivation is likely to be repaid. It is worth while to continue the experiment of converting a tract of usar into a profitable reserve of fuel and fodder. The method is to prohibit grazing, to plant suitable trees such as the dhák, and to sow selected grasses which will improve the quality of the hay.

7. The experiments carried out in the Cawnpore Experimental Farm are described in detail in the annual report on the Farm. This institution was visited several times during the year by the Agricultural Chemist to the Government of India, and further experiments will be conducted in communication with him and under his advice. No special knowledge appears to have been gained by the experiments conducted during the year under report.

8. Of the private farms, that conducted by your Personal Assistant (Babu Lachman Parshad) is described as the best. The value of the results achieved by him is enhanced by the fact that the means employed are of a simple nature, and presumably within the competence of the ordinary cultivator. The management of the Demonstration Farm near Meerut broke down when the official from Cawnpore, who really managed it, was called away. It cannot be expected that a Government Department will lend its officers indefinitely to

superintend the management of private farms, and unless officers so deputed temporarily are able to train the owners of the farms, or their agents, in the work of management, the object of their deputation will not have been attained.

9. The season was not a favourable one for the gardens at Saháranpur and Lucknow. The expenditure on the two institutions amounted to Rs. 20,579 and Rs. 15,300 respectively, and the receipts to Rs. 17,384 and Rs. 13,312 respectively, not including the value of seeds and plants supplied free to soldiers' gardens or public institutions. It would be as well in future to give the value of these free supplies. The demand for seeds and plants has continued to increase. The experiments with foreign fruits were not a success.

10. The return of agricultural implements distributed shows an increase from 138 in the preceding year to 151 in the number sold, and a decrease in the number given on trial or hire, the total being 190 against 215. The number of ploughs sold increased from 88 to 111. The necessity of having a trained mechanic to supervise this branch of the Department's work is urged, but there is a difficulty in providing a sufficient salary.

11. The quantity of seed distributed increased from the preceding year, the increase under wheat (73,402lbs. against 26,975lbs.) being particularly large, owing to a large indent for Muzaffarnagar wheat for Burma.

12. The returns of foreign traffic are characterised by a large falling off in the import of timber from Nepal, which is attributed partly to exhaustion of the forests and partly to restrictions imposed by Nepal.

The registration of rail-borne traffic shows a decrease under imports and an increase under exports, owing to the improvement in the agricultural resources of the province, which has resulted from a succession of good harvests. The total value of the rail-borne trade was Rs. 31,21,39,831 against Rs. 30,47,57,240 in the preceding year.

The export of wheat decreased, the figures being 8,251,464 against 9,908,142 maunds. It was still, however, much greater than the average (4,854,249 maunds) of the 10 previous years. Special inquiry has been made to ascertain whether the very large exports of wheat in 1891-92 had any effect in causing a change in the staple food of the country, and the conclusion arrived at is that it has not, and that the produce exported was surplus produce which could well be spared. The reason for this conclusion is that the difference between exports in an unusually good and an unusually bad year is much less than the difference between the outturn of a good and a bad harvest.

13. The Dairy Farm at Cherat (Aligarh) continued to work with success under the supervision of the native manager when Mr. Keventer left India on furlough, though occasional complaints are reported to have been made that the butter was not so good in quality as formerly. A new dairy was opened at Lucknow in connection with the Jail, and

here, as at Aligarh, the existence of a great demand in this country for good dairy produce has been fully proved.

14. An Agricultural School was experimentally established at Cawnpore in July 1893 and had 20 students at the close of the year, of whom 15 were candidates for kánúngoships.

A boarding house was in course of construction, and was nearly ready at the end of the year. It is hoped that when suitable accommodation can be provided it will be possible to arrange for the deputation to the school of some minor proprietors whose estates are under the Court of Wards, in order that they may study the principles of agriculture.

I have the honor to be,

SIR,

Your most obedient servant,

J. J. D. LATOUCHE,

*Chief Secy. to Govt., N.-W. P. and Oudh.*

# REPORT

ON THE

# Operations of the Dept. of Land Records & Agriculture,

# NORTH-WESTERN PROVINCES AND OUDH,

FOR

*THE YEAR ENDING 30TH SEPTEMBER 1894.*

*ALLAHABAD:*

Printed at the North-Western Provinces and Oudh Government Press.

*1894.*

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# *REPORT on the Operations of the DEPARTMENT OF LAND RECORDS AND AGRICULTURE, North-Western Provinces and Oudh, for the year ending 30th September 1894.*

No. $\frac{196}{\text{VIIII}-}$.

FROM

F. E. TAYLOR, ESQ.,
OFFG. DIRECTOR OF LAND RECORDS AND AGRICULTURE,
N.-W. PROVINCES AND OUDH,

To

THE CHIEF SECRETARY TO GOVERNMENT,
N.-W. PROVINCES AND OUDH.

*Dated Lucknow, the 6th November* 1894.

SIR,

I HAVE the honor to submit the Annual Report on the work of this Department for the year ending 30th September 1894.

2. Mr. Miller held the charge of the Department up to the 10th November 1893, on which date he proceeded on a year's furlough. The Assistant Director, Saiyid Muhammad Hadi, held charge of the Director's office from the 10th to 17th November, on which latter date Mr. H. Z. Darrah joined the Department and remained in charge of it up to the 24th July 1894, when he was relieved by me. The Assistant Director was on privilege leave from the 3rd to 18th July 1894, and the Personal Assistant, Munshi Saiyid Husain, acted for him.

3. In the beginning of October 1893 Mr. Miller went to Simla to join the Agricultural Conference that was held there. He visited Muzaffarnagar, Aligarh and Allahabad in the first week of November to dispose of questions which required his attention before his departure to England. He also got an opportunity of visiting the Fisher Forest near Etáwah, where a very large area of ravines has been covered. Mr. Darrah's time in the cold weather was mainly taken up with an examination preliminary to settlement of the districts of Bahraich, Bánda and Meerut. He also paid visits to Unao and Partábgarh to discuss with the Settlement Officers the question of the reallocation of patwáris' circles in those districts. At the end of the cold weather he attended the Nauchandi Fair held at Meerut. He also paid visits to Aligarh to see the dairy farm and usar reserves there. In the rainy season the usual kanúngo examinations were held by the Assistant Director and myself at Lucknow, Cawnpore, Benares, Fyzabad, Aligarh and Bareilly. I also visited the dairy and usar reserves near Aligarh and the Juhi reserve near Cawnpore in company with Dr. Leather, the Agricultural Chemist to the Government of India, and discussed at Moradabad with the Collector the question of constructing separate record-rooms for patwári papers.

4. The Assistant Director frequently visited the Cherat dairy and the usar reserves near Aligarh. A part of the cold weather was spent by him in touring through the district of Muttra with a view to make special enquiries with regard to the breeds of cattle existing in that district, and a report has been prepared by him on the subject. He also attended the shows held at Jaunpur, Meerut, Aligarh, Khairabad in Sitapur district, and Gola Gokarannath in Kheri.

## SECTION I.

### MAINTENANCE OF VILLAGE RECORDS.

5. This section of the report appears in detail in the annual report of the Board of Revenue. The following is a *resúmé* of the more important work done during the year under this head. The proposals made last year regarding preparation of districts by the Land Records establishment in anticipation of settlement have been approved and it has been decided this year to undertake a thorough revision of records in the districts of Bahraich and Meerut, as well as in the Lalitpur sub-division of the Jhánsi district. Arrangements have also been made at the same time to give thorough and practical instruction in survey work both in the field and in office to the patwári teachers and supervisor kanúngos in the provinces, in order to make them fully qualified to train the patwáris and supervise their work more efficiently for the proper and accurate maintenance of village maps and other records, which form the basis of settlement operations, and thus render themselves more useful to the administration. The reorganization of patwáris' circles and the redistribution of salaries on a more uniform and adequate scale, with a view to improving the position of the patwáris and absorbing unnecessarily small circles, is still in progress in districts in which the final reformatory schemes have not yet been introduced. The pay and the strength of the patwári staff in a portion of the Garhwál district, and in the Lalitpur sub-division of the Jhánsi district have been increased. A revision in Moradabad is under the consideration of the Board of Revenue. Proposals for the districts of Sháhjahánpur and Partábgarh are under consideration.

6. The kanúngo School, which has now been combined with the Agricultural School at Cawnpore, was continued during the year under report, and to encourage the attendance of candidates for kanúngoships the following concessions have been sanctioned in favour of those candidates who pass through the Agricultural School and receive certificates. They will draw the full pay of Rs. 30 per month (instead of Rs. 25) immediately on appointment; the English allowance of Rs. 5 per month will be given without further examination on the District Officer's certificate that the knowledge of English has been kept up; and they will have a preferential claim to appointment as kanúngo over other passed candidates or kanúngo apprentices on the district roll. The necessity of increasing the attractions of the kanúngo's post with a view to securing better men has been commented on in previous years' reports. Soon after the submission of last year's report the Board ordered that every fifth appointment as a naib tahsíldár in each division should be given to a kanúngo. During the past year four kanúngos were permanently promoted to naib tahsíldárships, 12 received temporary promotions to that post, four were appointed to officiate as tahsíldárs and two were made Sadr munsarims in the Settlement Department.

7. The Director was engaged for nearly the whole of the cold weather in inspecting the districts in which the current settlements will shortly expire, preparatory to the submission of the usual report regarding revision of settlement, while the native Inspectors were employed on inspecting the patwáris' papers and kanúngos' registers with a view to correcting errors of procedure and bringing defects to the notice of the district authorities. A considerable part of the Inspectors' cold weather was also taken up in assisting the Deputy Collectors, who were first appointed to start settlement operations in the districts of Bijnor, Fyzabad and Sitapur. The question of making a divisional distribution of the Inspectors was suggested in the Government of India's orders on last year's report and is being considered.

8. The collection of the orders issued for the guidance of patwáris and kanúngos together with extracts from Acts, Board's Book Circulars, Government Orders, &c., has been finished, and the portion relating to patwáris is being submitted in proof for the orders of the Board of Revenue. The remaining portion relating to kanúngos is in the press and will be submitted hereafter.

9. In November 1893 special instructions were issued by the Board of Revenue for the systematic examination of patwáris' papers by superior officers on tour, and arrangements have accordingly been made in almost all districts to complete the testing of each patwári's circle once at least in three years. During the past year rules have been issued with the sanction of the Board of Revenue for keeping up proper registers of patwáris' reports on calamities, so that the latter may not be lost sight of.

## SECTION II.

### Analysis of districts.

10. A description of the matters dealt with under this head has been given in the departmental report for 1892-93, and need not be repeated here. Mention was made in that report of the introduction in Muzaffarnagar of the revised forms of the mauza register and pargana book and the preparation of a pargana or tahsíl handbook from information given in the assessment and trade reports. The mauza register, pargana book and the handbook for one of the parganas of this district were submitted for the examination of the Board at the commencement of the present year. It was decided to prepare future handbooks for entire tahsíls instead of for each pargana separately. One or two changes in points of detail were also made in the pargana book form, and the form so modified was adopted for the rest of the district. To secure further economy and at the same time to minimize the time taken in compilation, the hands of the special officer deputed for this work were strengthened by an additional staff in May last. Some time was lost in training the new men, but by the beginning of the following month the speed of work was, as expected, nearly trebled. The work in Muzaffarnagar was completed in August, when the special staff maintained for it was removed to Bulandshahr. The expenditure on the work in the Muzaffarnagar district is detailed in the margin. Forms based on those introduced in Muzaffarnagar were drawn up for Oudh; and to the districts now under settlement in that province (where this work will be carried out under the settlement officer) the requisite number of forms both for the mauza register and pargana book, with instructions for compiling them and for preparing the handbook were sent at the end of the year. In the districts of Saháranpur, Jhánsi, Gorakhpur and Basti, which are all recently settled, and where the special staff will move after completing Bulandshahr, a rough register based on the revised mauza register form has been introduced to facilitate the work of the special officer.

| | Rs. |
|---|---|
| Pay of special officer ... | 3,840 |
| Pay of establishment ... | 1,552 |
| Travelling allowances ... | 53 |
| Contingencies ... | 88 |
| Printing and binding charges of registers ... | 485 |
| Total ... | 6,018 |

## SECTION III.

### System of collection of revenue and rental in precarious tracts.

11. In these provinces, this subject is dealt with by the Board of Revenue. At the instance of the Government of India, the Board asked the Director in November 1893 to indicate in his report as far as possible, in compliance with paragraphs 5 and 6 of G. G. O. No. $\frac{1795}{5}$ dated 24th July 1893, the parts of the North-Western Provinces and Oudh, which are liable to agricultural failure and specially those which have suffered during recent years. The information collected on the subject from the District Officers shows that there are no areas which can be specified as particularly liable to agricultural failure in the districts noted on the margin, although the Commissioner of the Rohilkhand Division states that Bijnor, Pilibhít and Sháhjahánpur have more or less precarious tracts. No report has been received from Rae Bareli; while the Collectors of Muzaffarnagar and Bareilly promise further enquiries. The following statement shows the tracts liable to agricultural failure as well as those which have suffered during recent years in the United Provinces, their exact position being shown in a map which forms Appendix G to this report.

| | |
|---|---|
| Saháranpur. | Fatehpur. |
| Meerut. | Allahabad. |
| Bulandshahr. | Jalaun. |
| Aligarh. | Gházipur. |
| Muttra. | Almora. |
| Agra. | Naini Tal. |
| Mainpuri. | Lucknow. |
| Etáwah. | Unao. |
| Bijnor. | Fyzabad. |
| Sháhjahánpur. | Sultánpur. |
| Pilibhít. | Partábgarh. |
| Cawnpore. | |

*Statement showing the precarious tracts in the North-Western Provinces and Oudh.*

| District. | Areas liable to agricultural failure. | Areas which have suffered during recent years. | Cause of failure. |
|---|---|---|---|
| 1 | 2 | 3 | 4 |
| Dehra Dún ... | Hill pargana of Jaunsar Bawar. | As in column 2 ... | Failure of rains. |
| Muzaffarnagar ... | Ganges khadir (14,628 acres). | ... | ... |
| Aligarh ... | ... | About 20,000 bighas in Khyr villages in 1890 and 1891. | Flood and want of proper drainage channels. |
| Farukhabad ... | Whole district liable to failure: no tracts could be specified—uncolored in map. | As in column 2 ... | Waterlogging. |
| Etáwah ... | ... | 36 villages ... | Flood. |
| Etah ... | Tahsíl Aliganj and most of the Kasganj tahsíl. | As in column 2 ... | Natural drainage channels not being in order. |
| Bareilly ... | 93 villages ... | Ditto ... | Floods. |
| Budaun ... | Khadir and Bhur tracts. | Bhur tracts ... | Waterlogging. |
| Moradabad ... | Tracts north of Adampur and west of Bachraon. | As in column 2 ... | Stagnation of water by overflow from Chandpur in Bijnor. |
| Bánda ... | Large area of inferior Mar and Kabar soils. | 431 villages ... | Kans. |
| Hamírpur ... | Whole district is more or less precarious. | Certain villages ... | Kans and scarcity of cultivators. |
| Jhánsi ... | Ditto ... | Pargana Garotha. Pargana Maraura (in Lalitpur) is now in a condition of doubtful revenue stability. | Kans. |
| Jalaun ... | ... | Whole district ... | Unfavourable season and heavy assessment. |
| Benares ... | 34 riverside villages ... | ... | Scanty or excessive rain. |
| Mirzapur ... | Tracts between the Vindhayas and the Sone and south of the Sone. | ... | Failure of rain. |
| Jaunpur ... | Rice lands (1,76,733 acres). | ... | ... |
| Ballia ... | 533 riverside villages ... | 97 acres in 1890 and 64,863 bighas in 1893. | Flood. |
| Gorakhpur ... | 509 villages (62,713 bighas). | As in column 2 ... | Do. |
| Basti ... | 326 villages ... | Ditto ... | Do. |
| Azamgarh ... | Those northern tracts of parganas Gopalpur, Sagri, Nathupur and Ghosi which adjoin the southern bank of the Ghagra. | Tracts mentioned in column 2 suffered in 1890. | Inundation during rainy season. |
| Garhwál ... | 377 villages ... | 595 villages in 1890 and 670 villages in 1892. | Failure of winter rains. |
| Sitapur ... | 275 villages (94,419 bighas). | Greater part is flooded every year. | Flood. |
| Hardoi ... | 260 villages (83,665 acres.) | 19,080 acres in 1299 Fasli and 38,080 acres in 1300 Fasli. | Do. |
| Kheri ... | Riverside tracts ... | A large number of villages. | Do. |
| Gonda ... | Parganas Balrámpur and Tulsipur (Balrámpur estate). | ... | Failure of rains. |
| Bahraich ... | 56 villages (4,649 acres). | As in column 2 ... | Floods. |
| Bara Banki ... | Riverside tracts ... | Certain villages ... | Do. |

12. Much is reported to have been done to relieve the distress in the Aligarh, Etáwah, Etah and Hamírpur districts. About Rs. 20,000 are advanced yearly under the Agricultural Loans Act in Jalaun. The precarious tracts in Budaun are receiving most careful attention and will be noticed by the Settlement Officer, when their assessments are reported. Very little or no use of takávi advances is reported to have been made in Benares, Moradabad, Gorakhpur, Basti, Azamgarh, Sitapur, Hardoi and Kheri, owing either to the proprietary body being rich or to the troubles the agriculturists find in receiving and paying the loans. The nature of precariousness in Mirzapur, Jhánsi and Farukhabad appears to obviate the necessity of agricultural loans to a large extent in those districts. In order to protect the precarious tracts from inundation in Ballia, projects for the repairs of the existing bunds were made, but Government abandoned them, thinking they would prove ineffectual. In Gonda the precarious tracts lie in Court of Wards estates, and the Deputy Commissioner suggests that large sums (half a lakh) be expended every year on bunds and drains. The only district in which takávi advances are reported to be positively essential is Bánda, where the Collector remarks that no action whatever except judicious advances under the Agriculturists Loans Act is necessary.

## SECTION IV.

### Measures of protection, including arboriculture.

13. **Reclamation of usar land.**—The three usar reserves at Juhi (near Cawnpore) and Cherat and Gursikran (near Aligarh) remained under the charge of the Department during the year and the usual experiments in grass and tree growing and in cultivation were continued on them.

14. **Juhi usar.**—The sowing and planting of grasses and trees have continued during the year under report.

Cultivation has also been tried on two patches, which were sown, one with country and the other with Assam paddy. A good outturn is anticipated. This experiment is useful as showing that the reserve is arriving at the stage at which cultivation could be introduced with a prospect of financial success. It is not, however, the policy of the Department to bring the reserve under cultivation, but to ascertain the possibility of turning such land into a fuel and fodder reserve.

The growth of grass continues to improve and the typical usar grass (*sporabolus pallidus*) is gradually making room for better grasses such as *cynodon dactylon* and *andropogon parturus*. Other kinds of good grasses have also obtained a permanent footing on the soil.

The heavy rain which fell at the end of September ruined a quantity of grass, which had been cut for hay. The outturn per acre of the hay subsequently made is only 7⅛ maunds at a cost of Rs. 2 per acre, the amount of saturation, which the soil has undergone following upon the long break in the rains in July having apparently rendered the grass very light. Some of the standing grass has also been sold.

A large number of babul seedlings has been raised and are doing well. Ninety-six old babuls, which interfered with the growth of other trees or whose roots had reached the kankar bed under the soil, were sold. Two hundred plants of *Agave Americana* which were put in last June are flourishing. *Sarpat* grass has been planted on a certain area. About 550 timber and fruit trees including 200 shisham have also been planted during the year and appear to be doing well. The plantation of dhák (*Butea frondosa*) and farásh (*Tamarix articulata*) was begun. The seedlings of the former are doing fairly well, but the farásh failed to germinate and cuttings which were obtained were also unsuccessful. The tanning trees planted in the previous year have made satisfactory progress.

15. **Cherat usar.**—Here the experiments include both cultivation and the raising of grass and fuel. Two acres of fresh land were broken up during the year and the total cultivated area now amounts to 88 acres. Of this area 28¼ acres were let to tenants at a rent of Rs. 142, the remainder being kept under direct management.

There was an improvement over the preceding year in the outturn of wheat and barley, but the former was again injured by the fungus *sehun*.

Some of the rice dried up in the long break in the rains which occurred in July, but the *soundi* variety did extremely well and appears to be well suited to the soil : it has not yet been harvested, but promises a high outturn. *Khurti* has done well and will be used in the green state as fodder. Sugarcane was tried in 1893, but was not a success, as the plots in which it was planted suffered from stagnation of water. No grass has been sown during the year, but the *batt* grass (*Diplachne fusca*) has made remarkable progress and has ousted the usar grass in places where it has gained a footing. It has in particular covered a bad piece of *reh*-infected soil which was enclosed by tanks to retain water as a means towards reclamation. *Dúb* (*cynodon dactylan*) and *sawán* grass are getting the better of the usar grass in places where the water can stand for some time. Systematic hay-making has not been tried here, but grass cut at different places has yielded hay of fairly good quality. The cattle of the Government Dairy Farm were grazed at different limited portions of the reserve in rotation.

No silage was made during the year under report, but silos filled in the preceding year were opened in January and used for feeding dry cattle. The juar silage was found to be good, but that made from grass was unfit for use.

Of the trees, several babuls planted last year dried up. Fresh ones have been planted to make up the loss. The sowing of *dhák* continued in a nursery formed in a good patch of land, from which the seedlings will be transplanted in the next rainy season, but seed sowed broadcast failed to germinate. Two hundred *farásh* cuttings were put in, of which many failed, but in places where *dúb* and other fine grasses have obtained a footing, and in shady parts of the usar the plants appear to be making satisfactory progress.

Under proposals lately sanctioned by Government, the Cherat usar is being leased along with the Government Dairy Farm to Mr. E. Keventer, the Dairy Expert, under conditions which will maintain in cultivation the land broken up, and preserve as far as possible the trees and grass on the usar. The direct connection of the Department with this reserve will thus cease for the term of five years for which the lease has been sanctioned. The cost of experiments conducted on the reserve since operations were started in 1885 is here noted :—

| | Expenditure. | Receipts. |
|---|---|---|
| | Rs. a. p. | Rs. a. p. |
| Up to 30 September 1893, ... | 21,572-13-9 | 7,551-1-2 |
| Year under report. ... | 3,457-4-0 | 5,018-9-4 |
| Total | 25,030-1-9 | 12,569-10.6. |

16. **Gursikran usar.**—The total area now cultivated amounts to 113 acres, including 3 acres broken up by tenants and 2¼ acres broken up under direct control during the year of report. The outturn of wheat in the rabi harvest was very poor, but that of barley was good for the class of land prevailing here, and averaged 8 maunds 32 seers per acre. Steeping the seed of the wheat in a solution of coal-tar has been found by the Assistant Director to prevent the attack of the *sehún* fungus to some extent. The rice crop suffered from want of rain in September, and the outturn is not likely to be high. Outside the cultivated area *Sporabolus pallidus* is the prevailing grass, but the *batt* grass (*Diplachne fusca*) is rapidly spreading, and *dúb* (*Cynodan dactylon*), janewa (*Andropagon annulatus*) and *gandár* have got the upper hand in places where water lies. The hay made last year has been used in feeding cattle; of that made this year the outturn has been 7¼ maunds per acre. The Assistant Director has made the following note: "Some of the villagers look with surprise upon the process of hay-making, as they have inherited from their ancestors the idea that dry grass is of no use, but as they have been actually shown that hay is eaten by animals, that idea is gradually giving way, and with a view to popularising

the use of hay I have told the supervisor to give away 25 acres to such cultivators as would come to cut the grass and store it."

The old babúl, nim and shisham trees on the reserve are doing well. Babúls have been raised from seed both in a nursery and broadcast: many have died but the survivors are doing fairly well. Self-sown babúls which have sprung up in several places are flourishing much better than those artificially sown. The date palms which number 103 grow very slowly. A beginning has been made of an experiment advocated by Dr. Leather, with the object of seeing what annual yield of firewood can be obtained from a plantation of a certain area, reproduction being at the same time kept up. With this view two acres have been planted with babúls and it is intended to extend the area gradually to five acres.

17. The year's operations on the úsar reserves show a financial gain due to large receipts at Cherat under the head of cattle and to a curtailment of expenditure. The figures for the year are :—

| Name of usars. | Expenditure. | | | Receipts. | | |
|---|---|---|---|---|---|---|
| | Rs. | a. | p. | Rs. | a. | p. |
| Juhi ... ... ... ... | 659 | 1 | 7 | 193 | 6 | 3 |
| Cherat ... ... ... ... | 3,457 | 4 | 0 | 5,018 | 9 | 4 |
| Gursikran ... ... ... ... | 1,120 | 13 | 0 | 839 | 9 | 6 |
| Total .. | 5,237 | 2 | 7 | 6,051 | 9 | 1 |

Up to the close of the year the total expenditure on the three úsar reserves from the commencement of operations amounts to Rs. 37,536-9-9, and the receipts to Rs. 17,717-15-11.

18. The Amramau plot which was formerly under the charge of the Department as an úsar reserve, and which was sold in 1892 after its reclamation, was also visited once by myself and three times by the Assistant Director during the year. The following short account of it is given with reference to paragraph 6 of the Government Review on last year's report. About 30 bigahs of new land have recently been broken up by the proprietors and ploughed several times with the country plough. The land has been heavily manured with city sweepings and some poudrette pits have been bought for the rabi sowings. Irrigation in the dry weather is a difficulty but the proprietors are taking steps either to get a supply from the adjoining canal or to sink wells in the land. The land has not deteriorated, but on the contrary has been improved since its transfer to the present proprietors.

19. **Arboriculture.**—A separate report on the arboricultural operations in the United Provinces is submitted for the information of Government. The following salient features of the work done in the year ending 31st March 1894 may be here noticed.

The length of avenues at the beginning of the year was 8,012 miles (revised figures), and this length was raised to 8,231 miles during the twelve months. The percentages of total length of the four classes of roads provided with avenues are now 77,39,14 and 5, respectively. The expenditure was Rs. 72,279 and the income Rs. 57,775, the net cost to Government being thus Rs. 14,504, or less than half the net cost in the preceding year. In the Bundelkhand districts, where unsatisfactory results had been noticed in former years, greater attention has been paid to the matter and the receipts have improved, but still fall far short of the expenditure. Under orders issued by Government the District Engineer has been requested in several districts to take charge of arboriculture on 1st class roads as part of his official duty.

Assistance from private individuals has been particularly noticed in Allahabad, and has also been afforded in other districts. Supervision has generally been effective, though some of the reports indicate apathy on the part of District Boards. Ver-

nacular copies of that part of the Arboricultural Manual issued last year, which deals with actual tree planting. have been printed and circulated among District Boards and Tahsíldárs.

## SECTION V.

### AGRICULTURE, INCLUDING EXPERIMENTAL FARMS.

20. **Cawnpore Experimental Farm.**—The results of the agricultural experiments tried at the Government Experimental Farm, Cawnpore, in 1893-94, have been described in full detail in the report of the Farm for that year. The rains were excessive during the year, and damaged the rabi to a greater extent than the kharíf crops. Among the latter the foreign varieties of cotton suffered particularly. The yield of wheat was light in consequence of the too luxuriant growth of straw caused by excess of moisture.

Of the various mineral and organic manures tried on maize, sheep-dung used alone and with bone-dust gave the best outturn.

An experiment tried continually during the past eight years has established the value of woollen-refuse mixed with lime as a manure for maize. This manure can only, however, be obtained in the neighbourhood of mills, and the experiment is therefore of less value than those made with manures which are universally procurable. The advantage of sowing maize before, instead of after, the break of the rains was again demonstrated.

The crops of foreign and Khandesh varieties of cotton were much damaged by the rains and by an insect pest, and the results only show that the country variety is less susceptible to injury by the effects of bad weather than any other variety tried at the Farm. In an experiment to determine the comparative effect of farmyard manure, gypsum, and bone dust on indigo, farmyard manure gave the best results. Bone dust produced a higher outturn, but is far too expensive a manure to give good financial results. An experiment was tried with indigo seeds varying from one to five years old to determine their comparative vitality and productive power, with the conclusion that under ordinary circumstances the older the seed the poorer the yield both of stalks and seed, but that old seed was not absolutely unfit for sowing, as is sometimes supposed. Among the various manures applied to wheat, the best results were obtained from the plots to which saltpetre mixed with ashes of cow-dung had been applied. This mixture is specially valuable as it is within easy reach of the ordinary cultivator. Sheep-dung applied alone and with bone dust and gypsum also gave very good results; and a higher outturn was obtained this year by using saltpetre as a top dressing instead of ploughing it in before sowing as in former years. Among the vegetable and green manures applied to wheat the best results were obtained from old and fresh indigo refuse ploughed in. The plot in which wheat alternated with lucerne also produced a good outturn.

In the experiment to determine the effect of deep and shallow ploughing on the growth of wheat without the application of a manure the results were in favor of deep ploughing with an improved plough: and ploughing 5 inches deep four times with an improved plough was found to be nearly as economical as ploughing 9 inches deep four times with the same plough.

Six varieties of Canadian oats were sown experimentally. The outturn of grain was poor, but that of straw was remarkably high, confirming the previous year's experiment with this grain. It would seem that the chief use of Canadian oats in this country will be for use as a nutritious green fodder.

The seed of Egyptian or Barsim Clover a favourite fodder crop in Egypt was obtained from that country and sown by way of experiment, with the special object of producing seed. Light loam was found to be the most suitable soil for the crop. Early sowing in winter, followed by weeding and irrigation in the earlier stages of growth, proved beneficial. Manuring did not appear necessary.

The experiments conducted at the Farm show that no exhaustion has hitherto taken place in the soil of plots in which a crop of wheat, maize or cotton, has been raised year after year without the application of manure.

A note by the Assistant Director on the use of bone as a manure for indigo and sugarcane, on which information was requested in the Government of India's Circular No. $\frac{12}{96-I}$-A., dated 11 June 1891, is appended to the report (*vide* Appendix E).

21. **Private farms.**—The *Meerut Demonstration Farm* was for the last six years under the management of Chaudhri Dehi Singh, Rai Bahádur. During the last two years his arrangements were far from satisfactory and the farm had been gradually getting into a very bad condition. In July last it was taken out of his hands and made over to the Collector of Meerut, who expressed his readiness to undertake its charge and do his utmost to further the aims and objects of this Department. Shaikh Wahid-ud-din, son of Shaikh Hafiz Abdul Karim, Khán Bahádur, C. I. E., came forward with an advance of Rs. 1,000 for working the farm, to be repaid either gradually out of the profits or refunded out of the stock and standing crops, if at any time it be found necessary to close the farm. For the practical work of the farm, the services of Muzuffer Khán, an apprentice of the Government Experimental Farm, Cawnpore, and the former Superintendent of the Demonstration Farm, have been lent to the Collector for one year from 1st July last, after which the Collector will make his own arrangements for the management of the Farm, and Muzuffer Khán will be withdrawn. The Collector has also proposed to combine with the farm an improved seed depót and a horse and cattle-breeding establishment. Arrangements are being made for supplying a Hissar bull and a ram, applied for by him, and the supply of a stallion is under consideration. A detailed programme of the kharíf and rabi experiments to be conducted at the farm was drawn up by the Assistant Director and sent to the Collector for guidance.

No new experiments were carried on at *Babu Lachman Parshád Barmah's* excellent farm near Cawnpore. The reclamation of raviny land continued and six acres of broken ground on the edge of a deep nala was selected. The cost of reclamation exceeded Rs. 200 per acre, but its proximity to the city and the existence of canal water enabled it to be rented freely for Rs. 20 per acre to the market garden cultivators.

*The Lyall Farm at Ujhauli*, which belongs to Chaudhri Saied-ud-din Husain of Budaun, is well spoken of by the Commissioner and Collector. The experiments conducted included the trial of different manures on Muzaffarnagar wheat, deep and shallow ploughing, and comparison of the effects of well and pond water for irrigation. In the last mentioned, pond water is said to have given the highest outturn. Canadian barley, which is said to have a greater yield than the country variety, and some foreign kinds of wheat were grown: 53 maunds 12 seers of different kinds of seeds were distributed from the seed store attached to the farm. There are two Arab stallions at the farm, one of which belongs to the District Board, and the other to the farm itself. Up to December last there was also a donkey stallion.

On the *Jatao Farm*, the property of Kuar Karan Singh of Firozabad in the Agra district, the rabi experiments were chiefly confined to different varieties of wheat, whilst the kharíf experiments were conducted with five varieties of millet of which the one called *básmati* is well spoken of as a fodder for cattle.

22. **Government Gardens.**—The season was, on the whole, favourable to both the Botanical and Horticultural Gardens at Saháranpur and Lucknow respectively, and the yield of fruits and vegetables was generally good. The Florida peaches, which at Saháranpur had not been very successful till 1893, gave then very encouraging results. Mr. Ridley of the Lucknow Gardens has imported plants of five new varieties of strawberries and is arranging to send them to cooler parts of India. A kind of *ber* seed imported from Mauritius has germinated freely. Seeds of four varieties of American cow pea (*vigna catiang*) were grown at Saháranpur with so much success that Government has approved the distribution of the small quantity of seed at present available

among the District Officers of the Rohilkhand Division for trial in their districts. The Superintendent of the Saháranpur Botanical Garden has agreed to train a number of juvenile offenders from the Reformatory School at Bareilly.

The Saháranpur Garden has been more than self-supporting, while the one at Lucknow is nearly so. The income of the former during the year under report (including Rs. 4,491 on account of the value of seeds and plants issued free to Soldiers Gardens or Public Institutions) amounted to Rs. 26,916, and of the latter (including Rs. 137, the value of trees distributed gratis, and Rs. 1,500, the contributions from Nazúl Funds) to Rs. 14,908. The expenditure on the two gardens was Rs. 21,477 and Rs. 15,500, respectively. The demand for seeds and plants is still much on the increase.

The term of five years' service of Mr. Gollan, Superintendent, Botanical Gardens, Saháranpur, having expired in February last, his re-engagement has been proposed and is under the consideration of Government.

The report received from the Khusru Garden at Allahabad shows as compared with last year an increase of Rs. 597 in receipts and a decrease of Rs. 1,000 in expenditure. The charges during the year (excluding Rs. 1,555 spent on certain improvements and in laying down pipes for irrigation) amounted to Rs. 2,444 and the receipts to Rs. 2,835. A further improvement in the results is expected in future.

Mr. Bullen has been appointed permanently as gardener at the Taj Gardens at Agra, which under his management have made satisfactory progress during the year under review. The charges were Rs. 15,777 as compared with Rs. 19,000, and the receipts Rs. 3,318 as compared with Rs. 940. The Agra Gardens are almost entirely ornamental and, from a commercial point of view, labour under disadvantages as to site and water. Results similar to those at Lucknow and Saháranpur cannot, therefore, be expected.

The season was very unfavourable both to fruit and potato cultivation at the Motesar Garden. The receipts fell from Rs. 1,435 to Rs. 932, whilst the expenditure rose from Rs. 2,843 to Rs. 3,301. One and a-half tons of potato tubers of the best varieties, purchase of which was sanctioned from the seed imprest at the disposal of this Department, were imported at a cost of Rs. 308, excluding transit charges. It is anticipated that the outlay will be recouped by sales to growers, and that the new stock will greatly improve the outturn of hill potatoes.

## SECTION VI.

### Introduction of agricultural improvements.

**23. Agricultural Shows.**—The shows held at Jaunpur, Khairabad, Gola Gokarannath and Meerut were attended by the Assistant Director, and those named on the margin by the Superintendent of the Cawnpore Experimental Farm (Saiyid Ali Husain) and other officials of the Department deputed to arrange for the exhibition of agricultural implements. The Director (Mr. Darrah) was present at the Meerut Show.

Etáwah.
Bara Banki (Nawábganj).
Kheri (Gola Gokaran Nath).
Bulandshahr.
Muzaffarnagar.
Bindraban (Muttra).
Rámpur.

The officials who attended shows found great apathy on the part of the people with regard to agriculture, and except where the District Officer personally took an interest in the show, little assistance was as a rule received from the local authorities in the matter of properly showing off implements, &c. The Assistant Director reports that the most useful agricultural work was done at the Jaunpur fair where the Collector caused a large number of zamíndárs and cultivators to assemble daily to hear lectures given by the Assistant Director. They were also encouraged to question him on points on which they had any doubt or on which they desired information. A number of ploughs and some Muzaffarnagar wheat were distributed among prize-winners as part of their prizes. This method of bringing Muzaffarnagar wheat to the notice of agriculturists in the Eastern districts, where it has not yet been introduced, might

be adopted with advantage in other places. Ploughing matches were held at all the shows and the first prize was invariably carried off by the Watt's plough. In most places the light Baldeo plough made at the Cawnpore Departmental Workshops was adjudged superior to the country plough. Competitions were held at various places between the chain pump and the swing-basket, usually resulting in favour of the former. Several ploughs and pumps were sold at Khairabad through the assistance of the District Officer, Colonel Grigg.

The largest number of cattle were exhibited at Aligarh, and of agricultural produce at Jaunpur.

**24. Distribution of implements.**—The following statement shows the distribution of implements for the year under report as compared with the previous year :—

| Name of implements. | 1892-93. | | | | 1893-94. | | | | More. | Less. |
|---|---|---|---|---|---|---|---|---|---|---|
| | Sold. | Given on trial. | Given on hire. | Total. | Sold. | Given on trial. | Given on hire. | Total. | | |
| Ploughs ... ... | 111 | 2 | 11 | 124 | 339 | 11 | 16 | 366 | 242 | ... |
| Chain-pumps ... ... | 14 | 6 | 6 | 26 | 30 | 4 | 5 | 39 | 13 | ... |
| Grain-kibbling mills ... | 12 | 2 | ... | 14 | 17 | 4 | ... | 21 | 7 | ... |
| Chaff-cutters ... ... | 8 | 5 | 1 | 14 | 8 | 4 | .. | 12 | ... | 2 |
| Flour mills ... ... | 1 | ... | ... | 1 | .... | 1 | 1 | 2 | 1 | ... |
| Sugar pans ... ... | 1 | ... | ... | 1 | 2 | 1 | ... | 3 | 2 | ... |
| Dredgers ... ... | 1 | ... | ... | 1 | 1 | ... | 3 | 4 | 3 | ... |
| Boring apparatus ... ... | ... | 6 | ... | 6 | ... | 3 | ... | 3 | ... | 3 |
| American hoes ... ... | 2 | ... | ... | 2 | ... | ... | ... | ... | ... | 2 |
| Baldeo water-lift ... ... | 1 | ... | ... | 1 | 1 | ... | ... | 1 | ... | ... |
| Total ... | 151 | 21 | 18 | 190 | 398 | 28 | 25 | 451 | 268 | 7 |

There was a considerable increase in the sale of *ploughs* and *chain-pumps*. The price of the *Baldeo plough* which was Rs. 2 had to be raised to Rs. 2-8-0 this year, as it has been found impossible to turn out an efficient plough at a smaller cost. This did not however tend to decrease the sale. This plough is becoming so popular on account of its cheapness and durability that a number of cultivators came all the way from Farukhabad to Cawnpore to purchase them. The efficiency of the *chain-pump* for lifting water from tanks and canals is recognised unreservedly by those who have seen it at work, and it is hoped that in time they will be more extensively used by cultivators who can afford to buy them. It may be noted that the improved ploughs were this year made entirely by a mistri at the Farm Workshop.

**25. Distribution of seed.**—The following statement shows the distribution of seed in the year under report, as compared with the previous year :—

| Name of seed. | 1892-93. | 1893-94. | Remarks. |
|---|---|---|---|
| | lbs. | lbs. | |
| Wheat ... ... ... ... | 73,402 | 11,645 | |
| Barley ... ... ... ... | 984 | 1,025 | |
| Oats ... ... ... ... | 6,152 | 11,740 | |
| Peas ... ... ... ... | 90 | 82 | |
| Sorghum ... ... ... ... | 716 | 212 | |
| Lucerne ... ... ... ... | 46½ | 58 | |
| Guinea grass ... ... ... ... | 11½ | ½ | |
| Mangel ... ... ... ... | 18 | 20 | |
| Turnips ... ... ... ... | 2 | 2 | |
| Reana grass ... ... ... ... | ... | 8 | |
| Egyptian clover (Barsim) ... ... ... | ... | 61 | |

A notice had been put in the *Pioneer* towards the close of the preceding year advertising the sale of seed at the Government Farm, and with reference to that notice indents were received chiefly for *oats, lucerne and guinea grass.* There has consequently been a great increase under the first two, but the demand for *guinea grass* could not be met, as the seed of the grass was not in stock and could not be obtained from the well-known seed stores of this country. *Guinea grass* roots were, however, supplied to such persons as agreed to have them instead of the seed. The cultivation of this grass has been somewhat extended at the Farm and seed is being collected now with a view to meet future demands. There is an apparent decrease under *wheat* as compared with the past year, but it is due mainly to the fact that the past year's figures include the heavy supply of 800 maunds or 65,600lbs. made to Burma. This was of course an extraordinary indent, and if this quantity be deducted from the past year's figures, the balance which represents the ordinary distribution will be found to have been improved upon in the year under report. The decrease under peas is insignificant. Supplies were sent during the year under report to places as distant as Baroda.

The seed of *Egyptian clover* (Trifolium Alexandrinum) was obtained from Egypt and was distributed chiefly among owners of private farms for experiment. The decrease under *Sorgham* is due to the fact that the outturn of this crop has been very poor during the past two years on account of excess of rain, and there was not enough of this seed in stock to meet the demand.

26. **The Agricultural Association and Local Associations.**—No general meeting of the Agricultural Association could be held this year. In the cold weather of 1893-94, Rao Mahabir Parsada Narain Singh Bahadur of Baraon in the Allahabad district expressed a desire that a meeting should be held at his residence under Mr. Miller's superintendence, but no date could be fixed for it, and at the request of the gentleman named above the meeting of the association was postponed until the next cold weather.

Rao Bahadur Mahabir Parsada Narain Singh is also the Secretary of the Porter Agricultural Association at Allahabad, the report of which for the year 1299 fasli reached the Department when the latter's report for 1892-93 had gone to the Press, and a brief abstract thereof is therefore given now along with similar information for the year 1300 fasli, the report on which has just been received.

In 1299 fasli, 183 maunds of Muzuffarnagar wheat were distributed among cultivators on the *sawai* system by the Secretary. It was found that the average yield of this wheat in the majority of cases exceeded that of the local variety. The association is doing good work in its efforts to introduce a still wider cultivation of this wheat. In 1300 fasli the amount distributed as seed rose to 230 maunds. The last report states that after four or five sowings the Muzuffarnagar wheat degenerates to the level of the ordinary *desi* wheat. If this is so, periodical importation of fresh seed is a necessity. The association succeeded in increasing the area under sugarcane in the Allahabad district by 948 acres, and in introducing a more general adoption of the Behia mills among the cultivators.

Forty-one new masonry wells were constructed during 1299 fasli in pargana Arail by the cultivators, aided partly by the Secretary and partly by Government. The improvement in the sources of irrigation is especially noticeable in the report of the Branch Committee of Baraon. Among manures tried, the effect of mango flower on sugarcane is favorably mentioned in the 1299 fasli report, and that of rotten sugarcane leaves of the 1300 fasli report.

In 1299 fasli the Secretary showed the cultivators of villages near Baraon the method of making silage. The silo pits were inspected by the Assistant Director in the middle of October 1893. The reports of the rest of the Branch Associations had not reached the Department at the time of going to press.

27. **Agricultural Journal.**—In G. O. No. $\frac{1442}{1\text{-}218}$ dated 27th May 1893, the Government, while reviewing the annual report of the department for 1891-92, suggested the advisability of bringing out a Hindi version of the Agricultural Journal in order to bring the instructions which it contained within easier reach of the native agricultural classes, the majority of which know only Hindi. The manager of the Lucknow Printing Press, who came forward to make an experiment on his own responsibility, was accordingly allowed to publish a translation of the journal in Hindi. Only three issues of the Hindi version have been out as yet, and five copies of each issue have been circulated by this Department to each District Officer of the North-Western Provinces and Oudh, with the request that the attention of the agricultural classes may be drawn to the benefits likely to be derived from the journal. The number of Hindi copies in demand has not as yet exceeded sixteen, and the applications connected therewith have all been sent to the manager of the above Press for compliance. With the exception of the portions dealing with agricultural chemistry, the technicalities of which are sometimes difficult to translate with exact precision into Hindi and are likely to be beyond the grasp of the ordinary cultivator, and which have accordingly been omitted from the Hindi version, the arrangement of matter in the latter is the same as that in the Urdu copy. As soon as the Manager of the Lucknow Printing Press is able to bring out the Hindi Journal with greater punctuality and regularity, it is hoped that with the assistance of the Director of Agriculture in Bengal a number of subscribers will be obtained for it in Behar where Hindi is more extensively read.

The Urdu Journal consists of twenty pages, the first five of which are devoted to editorial notes, the next four contain translations of the Farm and other agricultural reports, the following six are taken up with the translation of extracts from English Journals, and the last five are intended for miscellaneous notes, correspondence and advertisements.

The circulation of the Urdu copy of the journal has undergone some decrease during the year, the total number of copies now issued being 300, against 380 in circulation in the preceding year. This is to a certain extent due to the publication of the Hindi copy, but chiefly to the fact that as the subscription to the journal is payable in advance, the names of a good many of the subscribers, who would not pay in spite of numerous reminders, had to be struck off.

In the latter issues of the journal a series of articles on the rearing of the *Eri*-silkworms of Assam, containing the results of the experiments now being made at the Experimental Station, Cawnpore, have appeared and have, it is believed, been read with interest.

28. **Boring apparatus.**—The two well-sinkers under the employ of the Department conducted boring experiments in the districts of Meerut, Bulandshahr, Budaun and Jaunpore, and made 36 borings. In addition to these, one boring was made in the Director's office compound and the result was very satisfactory, and in course of this boring opportunity was taken of acquainting the students of the Agricultural School with the various operations in connection with the well-sinker's practical work. There was a decrease in the total number of borings as compared with the past year, owing to a decrease in the number of applications from private individuals for the services of well-sinkers. As usual, the pay and travelling expenses of these men are met by private individuals, who indent for their services for the period of such employment, and the Department has to pay only for the period during which there is no demand from private employers. The total charges on this account during the year under report came to Rs. 75-5-2 only. The Department also lends out tools to native gentlemen and others on favorable conditions. The expenses connected with the railway freight, repairs and purchase of new implements amounted to Rs. 435-6-0.

## SECTION VII.

### REGISTRATION OF TRAFFIC.

29. The following traffic was registered during the year 1893-94 :—

(1) Foreign traffic with Tibet and Nepal.

(2) Rail-borne traffic.

(3) Inland traffic.

30. *Foreign traffic.*—The following table shows the total amount of imports and exports during 1893-94 as compared with the preceding year. The total value of the trade has decreased from Rs. 95,76,824 to Rs. 90,12,218 :—

| | 1892-93. | | 1893-94. | |
|---|---|---|---|---|
| | Weight. | Value. | Weight. | Value. |
| Imports— | Maunds. | Rs. | Maunds. | Rs. |
| From Tibet ... ... | 64,843 | 5,51,104 | 70,263 | 7,13,425 |
| From Nepal ... ... | 17,63,404 | 51,86,828 | 16,73,333 | 49,94,339 |
| Total ... | 18,28,247 | 57,37,932 | 17,43,596 | 57,07,764 |
| Exports— | | | | |
| To Tibet ... ... | 59,115 | 2,84,308 | 41,865 | 2,77,541 |
| To Nepal ... ... | 2,39,761 | 35,54,584 | 2,29,560 | 30,26,913 |
| Total ... | 2,98,876 | 38,38,892 | 2,71,425 | 33,04,454 |

*Tibet.*—The total value of imports during the year under report was Rs. 7,13,425, and of exports Rs. 2,77,541 as compared with Rs. 5,51,104 and Rs. 2,84,308 in the preceding year. The amount of borax imported appears to have been less than that obtained in the preceding year, while there seems to have been an increase in the amount and value of salt and wood. An increase is also noticeable in the value of horses, sheep and goats, while the value of cattle imported decreased by Rs. 23,585. The decrease in the export trade is under grain and sugar, while an increase has taken place under cotton goods and metals.

*Nepal.*—The total value of imports from Nepal in the year of report amounted to Rs. 49,94,339 and of exports to Rs. 30,26,913 as compared with Rs. 51,86,828 and Rs. 35,54,584, respectively, in the year before. The amount and value of ghi and oil-seeds imported into these provinces were below those of the preceding year; but, on the other hand, there was an increase in the value of rice and hides of cattle. Silver, which was imported in the preceding year to the value of Rs. 1,22,475, was not brought to these provinces in the year under report. The decrease in exports was chiefly under cotton goods.

Analysing the district figures, it appears that there has been an increase in the total imports to the districts of Pilibhit, Kheri, Bahraich and Naini Tal; and a decrease in those to Gonda, Basti and Gorakhpur. Exports from Pilibhít, Bahraich and Naini Tal increased, while those from Gonda and Gorakhpur decreased, chiefly under cotton goods. An increase in the imports of rice to the districts of Pilibhít and Kheri was more than counterbalanced by diminished imports to Gorakhpur. Imports of ghí to Pilibhít, Bahraich and Naini Tal slightly increased; while those to Gonda, Basti and Gorakhpur show a corresponding falling off. The imports of oil-seeds to Pilibhít show a slight increase, while a large decrease is noticeable in the import of oil-seeds to Gonda, Basti and Gorakhpur. Spices were imported into Pilibhít and Naini Tal in larger quantity than in the preceding year. Imports of timber to the district of Bahraich show an increase in the year of report; but the total imports of timber to the province, as a whole, remained as in the preceding year.

31. *Rail-borne traffic.*—The total rail-borne traffic of these provinces during the year under report amounted to 5,34,27,559 maunds valued at Rs. 32,25,20,653,

as compared with 5,68,77,050 maunds valued at Rs. 31,21,39,831 in the preceding year. The imports and exports of the two years are shown below :—

| | 1892-93. | | 1893-94. | |
|---|---|---|---|---|
| | Maunds. | Rupees. | Maunds. | Rupees. |
| Imports ... ... ... | 2,17,87,066 | 12,60,70,898 | 2,56,79,962 | 13,67,10,073 |
| Exports ... ... ... | 3,50,89,984 | 18,60,68,933 | 2,77,47,597 | 18,58,10,580 |
| Total... | 5,68,77,050 | 31,21,39,831 | 5,34,27,559 | 32,25,20,653 |

The import trade has risen by 38,92,896 maunds, while a decrease of 73,42,387 maunds has occurred in the exports of the province during the year under report as compared with those of the previous year.

The following table compares the statistics of the more important articles of trade during the years 1892-93 and 1893-94. The increase in imports is most noticeable in the case of grain. There is also an increase in the import of coal, cotton goods and metals, but the imports of salt show a considerable decrease. The decrease under exports is chiefly under wheat. Exports of cotton, indigo, oilseeds and sugar show an increase.

| | 1892-93. | 1893-94. | Difference. |
|---|---|---|---|
| | Mds. | Mds. | Mds. |
| Total exports ... ... ... ... ... | 3,50,89,984 | 2,77,47,597 | —73,42,387 |
| Export of Cotton ... ... ... ... | 7,86,715 | 10,03,908 | +2,17,193 |
| Ditto Wheat ... ... ... ... | 82,51,464 | 31,34,212 | —51,17,252 |
| Ditto Indigo ... ... ... ... | 35,319 | 61,379 | +26,060 |
| Ditto Oilseeds ... ... ... ... | 59,14,587 | 66,00,064 | +6,85,477 |
| Ditto Sugar ... ... ... ... | 50,15,546 | 55,56,935 | +5,41,389 |
| Total imports ... ... ... ... ... | 2,17,87,066 | 2,56,79,962 | +38,92,896 |
| Import of Coal ... ... ... ... ... | 89,53,564 | 95,26,300 | +5,72,736 |
| Ditto Cotton goods ... ... ... ... | 10,24,742 | 10,69,487 | +44,745 |
| Ditto Grain... ... ... ... ... | 12,19,833 | 38,15,340 | +25,95,507 |
| Ditto Metals ... ... ... ... | 15,52,494 | 17,80,150 | +2,27,656 |
| Ditto Salt ... ... ... ... ... | 44,95,424 | 41,13,930 | —3,81,494 |

The exports of cotton rose by 2,17,000 maunds, about three-fourths of which went to Calcutta and one-fourth to Bombay: the imports also rose by about 32,000 maunds. The exports of wheat during the year under report fell off by more than 51 lakhs of maunds, and concurrently therewith the imports rose by about 9½ lakhs of maunds, the increase occurring chiefly in the imports from the Punjab and partly in those from the Central Provinces and Rájputána and Central India. The exports of grains other than wheat fell from 73,55,375 to 40,24,105 maunds, while the imports rose from 10,73,346 to 27,12,550 maunds. Gram, pulses, juar, bajra and other grains were imported from the Punjab, in which province the outturn of these crops was abundant, whilst in the North-Western Provinces and Oudh these crops were sown in 1893 on a diminished area and the outturn suffered from a bad season. The exports of indigo increased by 74 per cent. as compared with those of the previous year. The indigo trade of the provinces had considerably declined in recent years on account of the low prices which indigo fetched

in Europe, but a favourable season and a rise in the price of indigo at Calcutta led to a great extension of indigo cultivation in 1893, in which year the area under indigo exceeded that in the previous year by 70 per cent. The exports of all kinds of oilseeds have risen from 59,00,000 to 66,00,000 maunds, and almost all went to Bombay. The increase in the export of sugar is principally in the form of gur, and is due to successive good harvests of sugarcane and to a great extension of its cultivation in late years. The imports of salt show a falling off by 3,81,494 maunds. The decrease occurred entirely in the receipts from Rájputana and has taken place in every part of the province. Imports from Calcutta and the Panjab show a slight decrease, while those from the Bombay Presidency are more than double what they were in the year before.

To sum up. The year's statistics of trade transacted by rail show diminished exports coupled with increased imports. The decrease in exports occurred mainly under wheat; while the increase in imports is under grain. In spite of unfavourable seasons, the spring and autumn harvests of 1893 were considered good on the whole, and it was not expected at the time that the province would curtail its exports and increase its imports of grain from the neighbouring provinces. In the Panjáb, however, the harvest was plentiful and the prices of principal food-grains ruling in that province were comparatively much lower than those prevailing in the North-Western Provinces and Oudh: hence traders apparently found it profitable to import grain to these provinces.

32. **Road and river traffic.**—The road and river traffic posts located in April 1891, in the districts of Rae Bareli, Partábgarh, Sultánpur, Fyzabad, Jaunpur, Azamgarh, Gházipur and Ballia were maintained during the year under report. In the district of Rae Bareli one post was abolished during the year and two new posts were established in the Ballia district in order to gauge the traffic on the Ganges and Ghogra rivers. The following table compares the traffic of 1893-94 with that registered in the preceding year. In 1892-93 an increase in the exports of grain from these districts was noticeable; but during the year under review the exports of wheat and grain diminished concurrently with an increase in the imports of these articles.

| | Import. | | Export. | |
|---|---|---|---|---|
| | 1892-93. | 1893-94. | 1892-93. | 1893-94. |
| | Mds. | Mds. | Mds. | Mds. |
| Rae Bareli ... ... | 2,39,218 | 2,40,530 | 3,62,691 | 2,70,275 |
| Partábgarh ... ... | 1,55,640 | 1,77,593 | 5,03,235 | 4,06,081 |
| Sultánpur ... ... | 4,13,263 | 4,39,657 | 7,32,523 | 6,06,888 |
| Fyzabad ... ... | 12,67,896 | 12,52,978 | 5,32,480 | 4,74,869 |
| Jaunpur ... ... | 11,86,624 | 11,65,678 | 7,46,186 | 7,95,495 |
| Azamgarh ... ... | 18,60,999 | 8,30,064 | 7,68,603 | 7,35,175 |
| Gházipur ... ... | 5,63,605 | 4,78,012 | 2,42,460 | 2,53,568 |
| Ballia ... ... | 37,962 | 6,20,438 | 1,33,027 | 6,12,874 |

The registeration of three years' traffic of the eight districts mentioned above having been completed on 31st March 1894, the posts were abolished on that date and the registration staff moved to the Rohilkhand and Meerut Divisions, in which new posts were established in April. In January 1894 the Government at the request of this department deputed Mr. H. R. C. Dobbs, C. S., to inspect the various posts, in order to draw up a report on the results of three years' registration and the working of each post and to make suggestions for the improvement of this branch of the work of the Department. The report drawn up by Mr. Dobbs has been submitted to Government.

## SECTION VIII.

### PROMOTION OF HORSE-BREEDING OPERATIONS THROUGH CIVIL AGENCY.

33. During the year under review Veterinary Major G. J. R. Rayment, Superintendent, Civil Veterinary Department, North-Western Provinces and Oudh, who continued

to supervise these operations, inspected the Imperial and Provincial stands and the Saháranpur Rájpur line, visited several villages for the purpose of making enquiries regarding cattle breeds and diseases, attended six shows and the Simla Veterinary Conference, and submitted three separate reports, one on the Provincial and two on the Imperial Military and Revenue sections of his work. Salutris and other servants employed in districts have been placed by order of Government under the several District Boards. The post of Salutri has been declared to be one requiring professional skill, and rules have been made for the regulation of the office.

In 1892-93 the Superintendent purchased 17 stallions to which 13 were added during the year under report. Besides these, four stallions were purchased by private persons and Court of Wards' estates in addition to 12 bought during the preceding year. Thus there were on 31st March 1894 30 Provincial and 16 private stallions in addition to 106 Imperial horses. Out of 83 applications for stallions 21 were complied with during 1893-94, leaving 62 uncomplied with at the close of the year. Government bore two-thirds of the cost of keep of all the stallions issued except three, the full cost of which was met by private persons. There were no complaints regarding the stallions issued. Four thousand one hundred and thirty-four mares were covered by 17 Provincial, 10 private and 78 Imperial horses; statistics for the other stallions not being furnished by District Officers.

34. On a special report on mule-breeding submitted during the year, the provision for purchase of stallions in the budget for 1894-95 has been raised by Rs. 3,000 in order that Provincial mule-breeding operations might be begun. It has been settled that donkey stallions should be sold outright by the department or supplied to corporate bodies or private persons on the full cost of the maintenance being met by those persons. It is difficult, however, to obtain donkey stallions of a good class, and it is improbable that more than Rs. 1,500 will be utilized in the current year for their purchase. The balance of the budget provision will be used in the purchase of horse stallions with the applications for which it is difficult to keep pace. Ninety-five Imperial donkeys in the North-Western Provinces and Oudh covered 3,920 mares.

35. Arrangements have been made to obtain from District Officers early reports for the Veterinary Department on the occurrence of contagious and infectious diseases amongst animals. The information furnished by them and that collected by the Superintendent for the Assistant Inspector-General's conspectus of diseases under the instructions of the Government of India are embodied in the annual report of the Civil Veterinary Department for the year ending 31st March 1894.

36. Stud bulls of the Hissar and Kanwaria breeds have been distributed by this department from time to time. To extend operations on a larger scale, enquiries were made by the Superintendent and the Assistant Director last cold weather, and arrangements are now being made to procure animals for issue. A young bull of the Kosi breed was obtained from Muttra at the end of last year and is kept at the Cawnpore Experimantal Farm, where cows are brought to him. The object of this experiment is to see whether the local breed of cattle will be improved by crossing with a Muttra bull.

37. With a view to obtain an efficient staff, it was proposed to establish a veterinary hospital and school for Salutris at Lucknow, but the project has for the present been allowed to stand over, owing to financial pressure and to the taluqdárs of Oudh having expressed their inability to assist the scheme.

## SECTION IX.

### Miscellaneous.

38. **Dairies and dairy farming.**—The retention of Mr. Keventer, the dairy expert, having been sanctioned for another year, he joined the department in the middle of November, 1893, and, immediately after visited the Gursikran usar at Aligarh and the District Jail Dairy at Lucknow to see the condition of cattle and give any advice or assistance required. A special grant of Rs. 2,200 was sanctioned in December

1893 for the purchase of buffaloes, whose milk has been found more suitable for butter-making than that of cows, for the Aligarh dairy. Twenty-two cows at Aligarh were sold, and Mr. Keventer proceeded to Hissar to buy buffaloes. Twenty-two such animals with 17 calves were procured from there for Rs. 1,602. Besides these, 24 buffaloes and 49 calves were already in stock. In the month of June 1894 rinderpest broke out and caused a great loss among the dairy cattle. New cattle sheds were erected both at Gursikran and Cherat in the Aligarh district and some dairy appliances purchased. The quantity of butter sold during the year ending 31st March 1894 amounted to 26,111 lbs against 14,609 lbs issued in the preceding year. The receipts during 18 months ending 30th September 1894 amounted to Rs. 38,567 against an expenditure of Rs. 28,709, which does not, however, include the pay of the establishment. The demand for the Aligarh butter was greater in every month, as compared with the corresponding month of the preceding year, except in July, August and September. It has been supplied to every province of India except the Madras Presidency, and went as far as Kashmere in the north and Assam in the east. Ten persons, including two sent by the Director of Land Records, Panjáb, were admitted to the dairy free of charge to receive instruction in cheese and butter-making. Information as regards starting dairies has also been furnished in reply to applications on the subject. The number of private dairies has been rapidly increasing. The object of Government in demonstrating the profitableness of dairy farming having been thus gained, the dairy has been with the sanction of Government leased to Mr. Keventer for five years from 1st November 1894, and the live stock and plant of the dairy sold to him. Provision has been made for his services being at the disposal of Government to give advice in dairy matters in any place in the province. He has also undertaken to give this department any information required on the subject of the business of the dairy farm.

39. **The Agricultural School.**—No change occurred in the teaching staff of the school during the year. Rules for admission to the school were printed in an appendix to the report of the department for 1892-93. The school opened in July 1892 and 20 students read in that year. For the school course beginning July 1894, 18 students have entered, of whom three are candidates for teacherships, and one is studying estate management.

Five are Kayasths, five Banias, three Muhammadans, three Rájputs, one Bráhman and one Bhargava. Eight have passed the University Entrance Examination, two having been placed in the first division. Of those who entered in July 1892, 18 passed an examination qualifying for admission to the second-year's course and two were admitted to the senior course as a matter of grace, though they failed to qualify. One promising student had to leave the school on account of a deep-seated boil near his knee which incapacitated him for outdoor instruction. In November 1893 a young Rájput belonging to a large landowning family in Benares was admitted as a special case to a one-year's course of training in farming and estate management.

The school syllabus is appended to this report. It has been so far departed from that instruction in botany and surveying was continued to the second year's class, this having been found necessary to an efficient teaching of those subjects. Gymnastics are made a regular part of the school course, though there is no regular teacher for such exercises.

The second year students are cultivating plots of a quarter of an acre each entirely by themselves, all coolie labour being prohibited. A wide circulation has been given to the school syllabus and rules through the Director of Public Instruction, District Officers, Principals of Colleges, Head Masters of High and Zila Schools, and copies are also forwarded on application by private individuals.

The sanction of the Allahabad University has been obtained through the Director of Public Instruction to the students of the school after one year's study appearing in the optional subjects of (1) agriculture with surveying, and (2) chemistry and physics of the School Final Examination. Physics has accordingly been introduced,

with the sanction of Government, into the school course from the beginning of the present session. All the students now in the school will appear at the forthcoming School Final Examination in April next.

The building in which the school is located is in great need of a thorough overhauling. A project for entirely reroofing the school along with the Director's bungalow and the one in which the Head Master lives could not be carried out for want of funds. Another at a much lower cost for relaying the old tiles on new bamboos has for the present shared the same fate. I am very doubtful whether the roof can stand another rainy season; and it would certainly be running a distinct risk to carry on the classes next rains unless something is done to strengthen the roof.

The time of the school staff is fully occupied and the need for further assistance is keenly felt. On this matter Government is being separately addressed.

40. **The Lucknow Museum.**—All the important alterations and repairs were completed during the year, and the Museum buildings are now in excellent order with the extra accommodation provided. The total number of additions made to the several sections of the Museum amounted to 2,435, of which nearly half were presented by private individuals. A valuable collection of Himalayan and trans-Himalayan trophies was added to the zoological section, and a present of about 2,500 books of oriental literature has been offered by Munshi Newal Kishore, C.I.E., of Lucknow, as a contribution to the Reference Library. A descriptive register of the artwares, a detailed catalogue of the economic products and a list of the photographs in the Museum have been prepared. The number of visitors rose from 1,64,349 to 1,69,936, although the buildings were closed for some months on account of repairs. The receipts of the Museum amounted to Rs. 1,325 and the expenditure to Rs. 10,521.

41. **Sericulture.**—Under the orders of Mr. H. Z. Darrah, the late Officiating Director, Erisilkworms (*Philosamia ricini*) were obtained from Assam in June 1894 and reared at the Cawnpore Experimental Farm under the supervision of Pundit Darshan Lal Dube, the second master of the Agricultural School from July to October; the worms produced three broods, all of which yielded cocoons similar and even superior in quality to those obtained from Assam. As the worms feed chiefly on the leaves of the castor oil plant, which almost every cultivator can procure without any difficulty, and as the work of rearing is such as can be efficiently managed by young children and old people, who are past performing manual labour, there appears to be no reason why the breeding of silkworms should not be taken up by ordinary villagers, who can supply the necessary accomodation for housing the worms and the small amount of supervision required. During the short period of three months (July to September 1894) three zamíndár apprentices, one from Muttra and the other two from Fatehpur, were trained at the Farm and supplied with a number of live cocoons necessary for carrying on the business in their own places. Besides there are many native families in Nawábgunj (a town adjoining the Farm), in which these worms are now reared. On account of want of funds for providing a suitable house for rearing the worms the experiment could only be carried out on a small scale in the year under report. So far however it promises to be successful, and if the worms can be kept without serious difficulty through the dry hot months there seems no reason why sericulture should not be established in these provinces.

42.—**Specifications of inventions.**—Eight applications for permission to file specifications of inventions were received during the year from the Government of India for report.

43.—**General.**—The appointment of Assistant Director was held by Saiyid Muhammad Hadi throughout the year, with the exception of the period from 3rd to 18th July 1894, when he was on privilege leave, and during which the Director's Personal Assistant, Munshi Saiyid Husain, officiated as Assistant Director. Saiyid Muhammad

Hadi's health has not been good and has hampered him in the efficient discharge of his duties. Munshi Saiyid Husain's knowledge of the work of the department was of material assistance to me during the short term of my officiating charge.

I have the honor to be,

SIR,

Your most obedient servant,

F. E. TAYLOR,

*Offg. Director.*

# APPENDICES.

# APPENDIX A.

*Statement showing the expenditure and receipts of the Department of Land Records and Agriculture, North-Western Provinces and Oudh, for the Financial year* 1893-94.

| Heads of charges. | Budgeted allotment. | Actual expenditure. | Savings on budgeted expenditure. | Excess. | Receipts paid into Treasury. | Budgeted receipts. | Remarks. |
|---|---|---|---|---|---|---|---|
| | Rs. | Rs. a. p. | Rs. a. p. | Rs. a. p. | Rs. a. p. | Rs. a. p. | |
| Gazetted Officers' travelling allowance ... ... | 3,750 | 3,927 8 0 | ... | 177 8 0 | ... | ... | |
| Office establishment ... ... ... | 24,984 | 24,670 3 3 | 313 12 9 | ... | ... | ... | |
| Ministerial Officers' Travelling allowance ... | 1,540 | 1,532 12 0 | 7 4 0 | ... | ... | ... | |
| Kanúngo Inspectors' Establishment ... ... | 5,500 | 5,140 0 0 | 360 0 0 | ... | ... | ... | |
| Ditto travelling allowance ... | 1,900 | 1,899 6 0 | 0 10 0 | ... | ... | ... | |
| Officecontingencies ... ... ... | *6,932 | 6,932 0 5 | ... | 0 0 5 | ... | ... | *Includes Rs. 540 subsequently sanctioned for repairs to tents. |
| Traffic registration charges ... ... ... | †22,000 | 20,782 11 0 | 1,217 5 0 | ... | ... | ... | †Includes Rs. 3,000 contributed by Public Works Department. |
| Experimental Farm establishment ... ... | 4,616 | 4,354 8 2 | 261 7 10 | ... | ... | ... | The budget grant for 1893-94 was Rs. 4,756 out of which Rs. 140 were transferred to the Agricultural School. |
| Ditto contingencies ... ... | 9,044 | 9,041 2 6 | 2 13 6 | ... | 3,937 7 3 | 3,500 0 0 | |
| Ditto workshops contingencies ... | 4,600 | 4,599 2 5 | 0 13 7 | ... | 3,438 4 3 | 2,943 0 0 | Rs. 400 transferred to Agricultural School out of the budget grant Rs. 5,000. |
| Well experiments ... ... ... | 600 | 593 3 8 | 6 12 4 | ... | | | |
| Reclamation of waste lands ... ... | ‡5,600 | 5,597 8 1 | 2 7 11 | ... | 5,384 15 4 | 1,500 0 0 | ‡Includes Rs. 200 transferred from miscellaneous experiments. |
| Dairy experiment charges ... ... ... | §5,442 | 5,202 7 5 | 239 8 7 | ... | ... | ... | §Includes Government of India's contribution of Rs. 1,000. |
| Agricultural Shows ... ... ... | 630 | 653 10 6 | ... | 23 10 6 | ... | ... | |
| Breeding bull and stallion charges ... ... | 2,500 | 1,618 2 7 | 881 13 5 | ... | ... | ... | |
| Imperial Institute, London ... ... ... | 500 | 500 0 0 | ... | ... | ... | ... | |
| Miscellaneous experiments ... ... ... | 1,230 | 1,128 3 0 | 101 13 0 | ... | ... | ... | Rs. 200 transferred to reclamation of Waste Lands from the budget grant Rs. 1,430. |
| Kanúngo School, Cawnpore ... ... ... | 750 | 721 1 6 | 28 14 6 | ... | ... | ... | |
| Agricultural School ... ... ... | 4,020 | 3,288 0 0 | 732 0 0 | ... | ... | ... | Includes Rs. 140 sanctioned subsequently for scholarships. |
| Gházipur Stud Farm ... ... ... | ... | ... | ... | ... | 9,929 0 0 | 9,057 0 0 | |
| Miscellaneous ... ... ... ... | ... | ... | ... | ... | 353 7 9 | ... | |
| Total ... | 1,16,138 | 1,12,181 10 6 | 4,157 8 5 | 201 2 11 | 23,043 2 7 | 17,000 0 0 | |

NOTE.—Certified that the receipts in this office were checked in the manner prescribed in G. O. No. 34, dated 5th October 1882.

F. E. TAYLOR,
*Offg. Director, Land Records and Agriculture,*
*N.-W. P. and Oudh.*

# APPENDIX B.

*Statement showing receipts and expenditure of Juhi usar, Cawnpore, up to the 30th September* 1894.

| Expenditure. | | | | | Receipts. | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Name of heads. | From 1882 to September 1893. | From October 1893 to September 1894. | Total. | Remarks. | Name of heads. | From 1882 to September 1893. | From October 1893 to September 1894. | Total. | Remarks. |
| | Rs. a. p. | Rs. a. p | Rs. a. p. | | | Rs. a. p. | Rs. a. p. | Rs. a. p. | |
| Compensation for land ... ... | 216 0 5 | ... | 216 0 5 | | Reclamation ... | 87 12 0 | 89 11 0 | 177 7 0 | |
| Reclamation ... ... | 783 15 4 | 161 0 9 | 945 0 1 | | Cultivation ... ... | ... | ... | ... | |
| Cultivation ... ... | 300 0 0 | 22 10 6 | 322 10 6 | | Cattle. ... ... | 58 12 6 | 103 11 3 | 162 7 9 | |
| Cattle ... ... ... | 165 4 6 | 227 11 7 | 393 0 1 | | | | | | |
| Building ... ... ... | 684 6 9 | 39 1 0 | 723 7 9 | | | | | | |
| Contingencies ... ... | 51 8 6 | 16 9 9 | 68 2 3 | | | | | | |
| Establishment ... ... | 639 1 9 | 192 0 0 | 831 1 9 | | | | | | |
| Total ... | 2,840 5 3 | 659 1 7 | 3,499 6 10 | | Total ... | 146 8 6 | 193 6 3 | 339 14 9 | |

# APPENDIX C.

*Statement showing receipts and expenditure of the Cherat usar up to the 30th September 1894.*

| Number. | Expenditure. Heads. | From 1885 to September 1893 | From October 1893 to September 1894 | Total. | Remarks. | Number. | Receipts. Heads. | From 1885 to September 1893. | From October 1893 to 30th September 1894. | Total. | Remarks. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Rs. a. p. | Rs. a. p. | Rs. a. p. | | | | Rs. a. p. | Rs. a. p. | Rs. a. p. | |
| I | Compensation for land ... | 687 8 11 | ... | 687 8 11 | | I | Reclamation ... | 653 5 8 | 215 10 0 | 868 15 8 | |
| II | Reclamation of usar ... | 2,130 2 9 | 84 6 0 | 2,214 8 9 | | II | Cultivation ... | 802 9 0 | 281 15 0 | 1,084 8 0 | |
| III | Cultivation ... | 1,338 11 1 | 320 14 3 | 1,659 9 4 | | III | Cattle ... | 6,095 2 6 | 4,521 0 4 | 10,616 2 10 | |
| IV | Cattle ... ... | 12,058 10 6 | 2,370 14 3 | 14,429 8 9 | | | | | | | |
| V | Building ... ... | 3,006 11 11 | 13 2 3 | 3,019 14 2 | | | | | | | |
| VI | Contingencies ... | 244 4 0 | 34 2 0 | 278 6 0 | | | | | | | |
| VII | Establishment ... | 2,106 12 7 | 633 13 3 | 2,740 9 10 | | | | | | | |
| | Total ... | 21,572 13 9 | 3,457 4 0 | 25,030 1 9 | | | Total ... | 7,551 1 2 | 5,018 9 4 | 12,569 10 6 | |

## APPENDIX D.

*Statement showing receipts and expenditure of the Gursikran usar up to the 30th September 1894.*

| Number. | Expenditure. Heads. | From 1885 to September 1893. | From October 1893 to 30th September 1894. | Total. | Remarks. | Number. | Receipts. Heads. | From 1885 to September 1893. | From October 1893 to 30th September 1894. | Total. | Remarks. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Rs. a. p. | Rs. a. p. | Rs. a. p. | | | | Rs. a. p. | Rs. a. p. | Rs. a. p. | |
| I | Compensation for land .... ... ... | 1,440 12 0 | ... | 1,440 12 0 | | I | Reclamation ... | 3,430 15 5 | 444 4 9 | 3,875 4 2 | |
| II | Reclamation of usar ... ... ... | 1,754 4 6 | 125 3 0 | 1,879 7 6 | | II | Cultivation ... | 472 10 9 | 355 4 9 | 827 15 6 | |
| III | Cultivation ... ... ... ... | 594 6 8 | 337 8 9<br>4 13 9 | 936 13 2 | | III | Cattle ... ... | 65 3 0 | 40 0 0 | 105 3 0 | |
| IV | Cattle ... ... ... ... | 189 15 0 | 34 0 0 | 223 15 0 | | | | | | | |
| V | Building ... ... ... ... | 434 8 0 | 3 3 6 | 437 11 6 | | | | | | | |
| VI | Contingencies ... ... ... | 128 7 0 | 16 0 0 | 144 7 0 | | | | | | | |
| VII | Establishment ... ... ... | 3,343 15 0 | 600 0 0 | 3,943 15 0 | | | | | | | |
| | Total... | 7,886 4 2 | 1,120 13 0 | 9,007 1 2 | | | Total... | 3,968 13 2 | 839 9 6 | 4,808 6 8 | |

# APPENDIX E.

## NOTE ON BONE MANURE.

As desired in G. O. No. $\frac{1589}{I-568A}$, dated 4th July 1891, a series of experiments regarding the effect of bone-dust on indigo and sugarcane was conducted at the Farm and the result of each experiment is given in the two appended statements.

Lime, phosphoric acid and nitrogen, the chief fertilising ingredients of bone, are the essential substances of plant-food.

Bone is therefore no doubt a very good manure for the Indian soils, which are specially poor so far as the two last named ingredients are concerned. Bone, either pounded into meal or dust or dissolved in sulphuric acid, is a good manure for all crops, but in the former case it requires a good deal of time to thoroughly decompose so as to be available as plant-food. This statement is thoroughly borne out by the indigo experiment which was started in 1893. To plot No. 3 of the series mentioned in Statement I, although a very reasonable quantity of bone dust, viz., five maunds per acre, was applied, yet the outturn was poor in comparison with that of the plot treated with cowdung and was only a shade better than that of the one treated with gypsum. This was due to the fact that bone dust could not get time enough for thorough decomposition. After the indigo crop Muzaffarnagar wheat was sown in these plots without any manure being given to them. In the last kharíf season the same plots were again treated with the same manures as in 1893 and indigo was sown therein. The result was that this year, although excessive rains proved injurious to the Indigo crop in general and much more so to the plots under experiment, yet the outturn of the plots treated with bone dust was far better than that of any other plot in the series; but the increased outturn does not cover the cost of the bone manure, which is now becoming very expensive at Cawnpore, owing to the fact that fresh bones cannot be had under Re. 1-2-0 per maund including cartage. The labor for crushing it costs about one rupee and two annas a maund.

With regard to the effect of bone dust on sugarcane I have to say that as the statistics of only one year, which are herewith attached *, are as yet available, no definite opinion can be pronounced thereupon.

Vide Statement II.

Dr. Leather has started an experiment at the Farm in which bone has been applied to sugarcane in several ways. The crop is, however, still standing in the field and would take at least three months to ripen fully. The result will be noted next year.

Bone dust was also tried on sugarcane at Chherat usar, but the crop failed unfortunately on account of waterlogging.

SAIYID MUHAMMAD HADI,
*Assistant Director.*

## STATEMENT I.

*Statement showing the comparative effects of bone dust, gypsum and other manures on indigo.*

| Manure applied per acre. | Value. | Outturn of green indigo. | | | | Remarks. |
|---|---|---|---|---|---|---|
| | | 1893. | | 1894. | | |
| | | Per acre. | Value at 410 lbs. per rupee. | Per acre. | Value at 410 lbs. a rupee. | |
| | Rs. a. p. | lbs. | Rs. a. p. | lbs. | Rs. a. p. | |
| 180 maunds cowdung ... ... | 5 6 0 | 12,136 | 29 9 7 | 2,204 | 5 6 0 | |
| 3 „ gypsum ... ... | 5 4 0 | 10,496 | 25 9 7 | 704 | 1 11 6 | |
| 5 „ bone dust ... ... | 11 4 0 | 10,660 | 26 0 0 | 3,196 | 7 12 9 | |
| Unmanured ... ... | ... | 7,380 | 18 0 0 | 2,304 | 5 9 10 | |

## STATEMENT II.

*Statement showing the comparative effects of bone dust and other manures on sugarcane.*

| Manure. | Quantity. | Value. | Weight of. | | Value of juice at 150 lbs. a rupee. | Remarks. |
|---|---|---|---|---|---|---|
| | | | Cane per acre. | Juice. | | |
| | Mds. | Rs. a. p. | lbs. | lbs. | Rs. a. p. | |
| Bone dust ... | 8 | 18 0 0 | 9,528 | 4,720 | 31 7 6 | |
| Ashes of cowdung ... | 180 | 5 6 0 | 11,740 | 5,944 | 39 10 0 | |
| Farmyard manure ... | 180 | 5 6 0 | 10,512 | 5,612 | 37 6 7 | |

APPENDIX F.

# AGRICULTURAL SCHOOL, CAWNPORE.

## SYLLABUS FOR THE FIRST YEAR'S COURSE.

### No. I.—Agriculture.

*General.*—The history, objects and scope of agriculture and the conditions influencing its pursuit. The climate and seasons of India in general and the North-Western Provinces and Oudh in particular.

*Soils.*—Formation. Physical characters. Fertility and barrenness. The reclamation of waste land and its preparation for cultivation. Improvement of soils. The sub-soil. Salt land, its formation and improvement.

*Tillage.*—Objects of tillage. Deep and shallow tillage. Ploughing, grubbing, sub-soiling, harrowing, ridging and rolling. Implements and tools used in tillage and seed-sowing. After-cultivation. The names and characters of the principal weeds.

*Manuring.*—Treatment and application of farm manures. Green manuring. Use of special manures, *e.g.*, oil-cakes, saltpetre, bones, lime, woollen refuse, &c. Top-dressing.

*Irrigation.*—Economy, use and application of water. Water-lifts in common use. Origin of springs. Well-sinking. Irrigation from tanks and canals.

*Crops.*—Rotations and mixed cropping. Fallowing. Seed-sowing. Seeds, germination and conditions favourable for germination. Pedigree influence. Collecting seed. Change of seed. Thick and thin sowing. Shallow and deep sowing. Testing seed. Dressing seed. Transplanting. Principal cereal, pulse and industrial crops, *e.g.*, wheat, barley, oats, jowar, bajra, maize, rice, gram, mung, urd, sugarcane, potato, cotton, indigo and poppy.

*Stock.*—Breeding, care and management of cattle and sheep. Breeds of the North-Western Provinces and Oudh. Dairying.

*Pasture land and its treatment.*—Green fodder. Raising of fodder crops. Hay-making and silage. Storage of fodder.

*Fruit and vegetable growing.*

*Text-book.—The First Book of Agriculture,* by C. Benson and C. K. Subba Row, will be used for the present. (*Price annas 3 and 6 pies.*)

### No. 2.—Physiography.

1. *The earth.*—Its shape and measurement; distribution of land and water; gravitation; causes of day and night; alternation of seasons; movements of the earth; maps; the compass; latitude and longitude.

2. *The atmosphere.*—Air: its composition; the effects of heat, wind, water-vapour, clouds, rain, hail, snow, dew, fog, the monsoons, storms, cyclones; the use of the barometer, thermometer and raingauge.

3. *The ocean.*—Extent, depth; composition of sea-water.

4. *Features of the earth and their changes.*—Continents; islands; mountains; volcanoes; rivers; river-deltas; water-sheds and water-parting; lakes; physical action of rivers; glacier action: erosion of valleys; floods; earthquakes.

5. *Composition of the earth.*—Rocks, their decomposition and denudation, with a very general account of the formation and distribution of soils. Soils: clay; sand; loam. Metals; coal; salt.

6.—*Land and its tenants.*—Effects of temperature; the tropics; effects of rainfall; other causes of variation of climate; distribution of man and higher animals.

*Text-book.*— *Physical Geography Primer* by Geikie. (*Price, annas* 10.)

No. 3.—CHEMISTRY.

No special syllabus required. The arrangement in Professor Roscoe's Chemistry in the Science Primer Series will be followed throughout. (*Price of the Primer, annas* 10.)

No. 4.—BOTANY.

(*Vegetable chemistry.*—Air, water, carbonic acid, ammonia, starch, cellulose, sugar, albuminoids, ash of plants.)

Nature of the cell and its constituents. Internal structure of the exogenous, endogenous and acrogenous stem.

Morphology of the angiospermous flowering plants.

Functions of the root, stem and leaves; absorption, transpiration, assimilation and respiration.

Fertilisation, adaptation for cross-fertilisation, germination.

Influence of light on plants.

Development of heat by plants.

Movements of plants.

Carnivorous plants.

Special attention should be paid to the following :—

Opium, mustard, the cabbage tribe, cotton, flax, orange, mango, indigo, varieties of spring and autumn pulses, tamarind, inga dulcis, lucerne, guava, the common gourds, safflower, brinjal, potato, chillies and tobacco, hemp, castor-oil, betel, aloe and onion, ginger, turmeric, plantain, rice, maize, panicums, bajra, sugar-cane, juar, doob-grass, wheat, barley, oats and bamboo, any fern.

*Text-book.—Botany Primer* by Hooker.

or do do. by Bentley (with Indian plants for examples in illustration). Price, annas ten.

No. 5.—SURVEYING (THEORY AND PRACTICE).

Surveying with the chain and with the plane-table; plotting to scale; various scales in use in the provinces; calculation of areas by mensuration and by area comb.

Those of the students who are candidates for kanúngoships will be required to devote more attention to this subject than others, especially to practical map work; and will be required to pass a special examination along with the ordinary kanúngo class. Such candidates will also be required to attend lectures and to pass examinations in the other subjects prescribed for kanungos.

## SECOND YEAR'S COURSE.

No. 1.—AGRICULTURAL SYLLABUS.

The portion included in the first year's course (treated more fully). The diseases and insect-pests of field and garden crops.

Farm-capital and labour. Stocking land. Disposal of produce. Conditions influencing the value of land.

*Text-books* recommended. *The soil of the Farm* by J. Scott and J. C. Morton (Farm Series edited by J. C Morton, price Re. 1-10-0) and

*The crops of the Farm* by several writers (the same series and price as the above),

or

*Elements of Agriculture* by W. Fream : *price*, 2*s*. 6*d*.

## No. 2 Chemistry.

### (*a*).—*General.*

*Theoretical.*—Differences between simple and compound substances, and between mechanical mixture and chemical combination. Laws of chemical combination in definite and multiple proportions.

Atoms and molecules; atomic weights and molecular weights; relation between the density of a gas and its molecular weight. Metric and English weights and measures. Combination of gases by volume. Atomicity of the elements. Compound radicals.

Symbolic notation, percentage composition, formulæ and equations. Calculation of quantities by weight. Illustrations and examples of chemical changes. Nature of acids, bases and salts. Principles of chemical nomenclature.

*Hydrogen Chlorine.*—Preparation and properties of these elements and of the compound formed by their combination.

*Oxygen.*—Its preparation and properties. Classification and properties of oxides. Ozone.

*Water.*—Its preparation, properties and constitution. Experimental methods of determining the composition of water.

*Sulphur.*—Its properties, occurrence in nature, and allotropic modifications. Sulphur dioxide, Sulphurous acid, Sulphur trioxide, Sulphuric acid and Sulphuretted hydrogen: their preparation and properties.

*Nitrogen, Nitric Acid and Ammonia.*—Their preparation and properties.

*The atmosphere.*—Simple experimental investigations of its composition by weight and by volume; its relations to animal and vegetable life.

*Carbon.*—Its occurrence in nature; its allotropic forms and properties. Oxides of carbon and carbonic acid: their preparation and properties.

*Phosphorus.*—Its sources and allotropic modifications. Phosphorus pentoxide, tribasic phosphoric acid and the principal phosphates: their preparation and properties.

*Silicon.*—Silica, silicic acid: their preparation and properties.

*Manufacture on a large scale of* the following acids:—

Sulphuric, Hydrochloric, Nitric.

*Metals.*—Their general, physical and chemical properties and classification. The natural sources, chief properties and uses of the following metals and their compounds:—

Sodium, Potassium, Ammonium, Calcium, Magnesium, Zinc, Iron, Copper, Mercury and Lead.

About a dozen general lectures on *organic chemistry* will also be delivered, by way of preparing the students for better understanding of agricultural chemistry.

*Practical.*—The following experiments on chemical manipulation as in Church's Laboratory Guide:—

1. Solution and Filtration.
2. Crystallization.
3. Volatility.
4. Specific gravity.
5. Washing by decantation.
6. Preparation of Hydrogen.
7. Ditto. Oxygen.
8. Ditto. Sulphur-dioxide.
9. Ditto. Ammonia.
10. Ditto. Carbon-dioxide.

11. Distillation of nitric acid.

12. Testing of waters.

13. Blow-pipe experiments.

14. Manufacture of superphosphate.

15. Experiments with lime.

16. Lime in soils.

17. Experiments with soil.

18. Do. „ Starch and sugar.

19. Do. „ Milk, butter, ghee and cheese.

20. Do. „ Bread.

21. Do. „ Cotton, wool and silk.

*Qualitative analysis.*—The ascertaining from compounds containing not more than a single base and acid the following :—

Sodium, Potassium, Ammonium, Magnesium, Iron, Zinc, Calcium, Hydrochloric, Sulphuric, Carbonic, Phosphoric, Nitric and Silicic Acids.

(*b.*) *Agricultural Chemistry.*

The origin and nature of soils and subsoils. Mechanical and chemical composition of soils.

The constituents of plants and animals. Plant-food and animal-food and their respective functions.

The differences between the products of plants and animals.

Plant-food in the soil. Effects of cultivation on the soil. Retentive powers of soils.

The seed. Germination. Nutrition and development of plants. Order in which plant constituents are assimilated and their ultimate destination. The effects of cropping on the soil. Composition of manures and principles of manuring. Valuation of manures.

The ordinary crops of North-West Provinces and Oudh, and their preparation for the market. Green fodder, hay, straw and ensilage.

The process of animal nutrition. Composition and digestibility of foods. Capacity of foods for producing heat and work. Albuminoid ratio. Requirements of young, adult, working, milking and fattening animals. Feeding rations and combinations of foods.

Relation of food to manure. The chemistry of the dairy :—milk, butter, ghee and cheese.

TEXT-BOOKS RECOMMENDED.

*General Chemistry.*—Lessons in elementary chemistry, by Sir H. E. ROSCOE (*Price, Rs.* 3-2-0).

or

*Introduction to the study of Inorganic Chemistry*, by W. A. MILLER (*Price, Rs.* 2-8-0).

or

*The elements of Chemistry* by REMSEN (*Price, 2s. 6d*).

*Agricultural Chemistry.—Chemistry of the Farm*, by R. WARRINGTON (*Price, Re.* 1-10-0).

*Practical Chemistry.—Laboratory Guide*, by A. H. CHURCH (*Price, Rs.* .)

NOTE.—Instruction in Agriculture and Chemistry will be given to the students of the 2nd year's class, mainly by lectures, and the students will be required to take down notes.

# ORDERS OF GOVERNMENT.

## No. $\frac{1032}{I-\frac{36B}{12}}$ OF 1895.

## RESOLUTION.

REVENUE DEPARTMENT.

*Dated Naini Tal, the 25th April* 1895.

READ—

Letter No. $\frac{196}{VIII-1}$, dated 6th November 1894, from F. E. Taylor, Esq., Officiating Director, being the annual report on the operations of the Department of Land Records and Agriculture for the year ending 30th September 1894.

OBSERVATIONS.—A summary is given in section I of the report of the more important work of the year in connection with the maintenance of village records. It was decided to undertake a thorough revision of the village papers in the Meerut and Bahraich districts and in the Lalitpur sub-division, in which tracts the current settlement will shortly expire. Since the close of the year the services of officers of the Survey Department have been obtained to supervise the work, and the revision has commenced. The areas mentioned had previously been examined, in the cold weather of 1893-94, by the Director. Further progress has been made in the revision of patwáris' circles, and an attempt has been made to popularize the kánúngo school with a view to attracting suitable candidates. Under the orders of the Board of Revenue, special attention has been given to the promotion of kánúngos to higher executive posts, and it is hoped that the measures taken will conduce to improve the *personnel* of this important branch of the record establishment.

2. The Director has included in paragraph 11 of his report a table showing the tracts liable to agricultural failure, which have suffered during recent years. The tracts are indicated in a map which forms the last appendix to the report. The information given has been collected in accordance with the desire of the Government of India, expressed on the receipt of the last Revenue Administration report. It is remarkable that in the Resolution of the Government of India No. 6G., dated 8th December 1881, no special prominence was given to the possibility of agricultural failure owing to excessive rainfall and its attendant evils—floods, saturation, and waterlogging. The provinces in recent years have suffered from excessive rainfall rather than from failure of the rains. The cycle of excessive rain will probably be followed by a cycle of deficient rainfall, and the aim of the Director should be, not to prepare annually a general list of villages liable to distress from any cause, but to indicate the tracts which have suffered in recent years, especially in the year under report; to investigate the cause of agricultural depression; to show what remedies have been applied, and to offer suggestions as to further remedial action. The Director's report must be founded on the results of an intelligent examination by Collectors and their Assistants of the statistics contained in the pargana book—a record which exhibits the circumstances

of every village as they annually vary, and which is continuously maintained by the land record establishments. In his 12th paragraph the Director gives a short summary of the measures adopted to relieve or remedy agricultural depression. In future this section should be expanded, and should be dealt with in that part of the Director's report which is submitted to the Board of Revenue, and which forms an appendix to the annual Revenue Administration Report.

3. The account given of the progress made in the Juhi, Cherat, and Gursikran reserves is interesting and satisfactory. At Juhi the experimental introduction of superior grasses has been attended with success, and further progress was made in the planting of timber and fruit trees. The outturn of hay was, however, poor, owing to the excessive rainfall of 1893. This plot is at present devoted entirely to experiments connected with the creation of fuel and fodder reserves. At Cherat, where experiments in the reclamation of waste land for purposes of cultivation are carried on in addition to those connected with fuel and fodder, some improvement in the yield of wheat and barley is recorded and a variety of rice which seems to thrive on the soil of the reserve has been discovered. Some silage made from juár in 1892-93 was opened during 1894 and found to be in good condition, though some grass silage made at the same time proved unfit for use. Since the close of the year under report this reserve has been leased to Mr. Keventer, the dairy expert, along with the adjoining Government Dairy Farm. Mr. Keventer has, however, engaged to continue the cultivation of the land which has already been broken up, and to preserve the trees and grass on the *úsar*. At Gursikran more land was brought under cultivation. The experiment of steeping in coal tar the seed of wheat which had been infected with the *sehun* fungus is said to have been partially successful in protecting the crop grown from the infected seed. It is not stated whether steeping in kerosine oil and a solution of copper sulphate and lime was tried, as the Director said, in his last report, was the intention. In this reserve also experiments in connection with fuel and fodder were continued.

There seems to be no reason to modify the conclusion expressed in paragraph 6 of this Government's review of the last annual report, to the effect that the present experiments should be confined to testing the possibility of converting sterile land into reserves of fuel and fodder. It is, however, satisfactory to note that the labour and money expended on the reclamation of the Amramau plot, which is no longer under the management of the Department, have resulted in an improvement, which, with a continuance of careful manuring, promises to be permanent.

4. The principal results of the year's working of the Cawnpore Experimental Farm have been to demonstrate the value of certain manures for maize, wheat, and indigo, and to show the use of Canadian oats as a fodder. The study of bone manure has been carried on since the Government of India drew attention to the matter in 1891, experiments having been undertaken at Cawnpore under the supervision of

the Assistant Director. Certain trials made at the suggestion of the Agricultural Chemist to the Government of India are still in progress. The working of the various private experimental farms is described in the report, but it is difficult to estimate the scientific value of these undertakings. At the Botanical and Horticultural Gardens maintained by the Government the progress made has been satisfactory and the management good.

5. One of the most generally interesting portions of the report is that which exhibits the increasing demand for improved agricultural implements and superior varieties of seed grain. The number of ploughs issued from Cawnpore was nearly treble that of the preceding year, and there was a noticeable increase in the requisitions for chain pumps. The local distribution of wheat, barley, and oat seed was considerably in excess of that for 1892-93. In the one branch agricultural association (Allahabad) whose operations are described, the exertions of Rai Mahabir Parshad Narain Singh, Bahádur, the Secretary, seem to be bearing good fruit. The fact reported by this branch that Muzaffarnagar wheat degenerates after four or five harvests on foreign soil is noticeable.

6. In accordance with the suggestion made last year by the Government, a Hindi version of the Agricultural Journal has been published with a view to the further diffusion of practical knowledge among the agricultural classes. At present the results have not been encouraging; not only has the demand for Hindi copies been small, but the circulation of the Urdu version has fallen off. Better results are, however, anticipated in the future from a probable extension of the sales in Behar, where Hindi is largely understood.

7. The trade with Thibet was considerably greater in value than in the preceding year, the imports and exports together being worth Rs. 9,90,966 as against Rs. 8,35,412 in 1892-93. The principal variations appear to have been decreases in the value of imported borax and cattle, and in that of exported grain and sugar, which were more than counterbalanced by increases in imports of salt, wood, horses, sheep, and goats and in exports of cotton goods and metals. The value of the trade with Nepal, on the other hand, decreased from Rs. 87,41,412 to Rs. 80,21,252, *i.e.*, by more than seven lakhs of rupees. Exports alone were less valuable than in the preceding year by about $5\frac{1}{4}$ lakhs. The principal falling off in exports occurred in cotton goods. The decrease in the imports is accounted for almost entirely by a difference of nearly $1\frac{1}{4}$ lakhs in the value of imported silver, the decreases which occurred in ghí and oil-seeds being almost equal to the increases in rice and hides. The Officiating Director did not hazard any explanation of the considerable variations which took place. Perhaps the most remarkable feature was the absolute cessation of the import of silver from Nepal.

8. The rail-borne trade of the North-Western Provinces and Oudh with other parts of British India also exhibits some remarkable fluctuations. Imports increased by nearly 39 lakhs of maunds and by over 106

lakhs of rupees in value. The main increases were in grain, coal, and metals, while salt alone among the principal imports showed a considerable decline of over 3,80,000 maunds. Exports declined by nearly 73½ lakhs of maunds and by over 2½ lakhs in value. Wheat was exported to the extent of 51 lakhs of maunds less than in the previous year, and the export of other food grains was less by 33 lakhs of maunds, but the more costly articles of produce—cotton, oil seeds, and sugar—left the provinces in much larger quantities than in 1892-93. The causes of the diminished exports of food grains seem to have been a contraction of the area sown for the autumn harvest and the indifferent seasons of 1893, which gave only moderate crops, while in the Panjáb the harvests were exceptionally plentiful and the importation of grain from that quarter was found to be profitable. This large import of food grains kept prices low. The grain was doubtless not all consumed in the province, and served to replenish the stocks of wholesale dealers.

9. The Government will defer its remarks on the operations of the Civil Veterinary Department until the separate provincial report is received. The progress of the Government Dairy Farm, which has since been leased to Mr. Keventer for five years, was very encouraging. The lessons taught by it are bearing good fruit by inducing the establishment of private dairies. The Government will notice with interest the progress of the experiment with silkworms which was commenced at the instance of Mr. Darrah, who officiated as Director during part of the year. Sericulture is without doubt an employment suited to the capacity of persons in the humblest condition of life, but it remains to be seen whether the climate of these provinces is suited to the keeping of the worms.

10. The acknowledgments of the Lieutenant-Governor are due to Messrs. Darrah and Taylor, who held charge of the Department during the greater part of the year, and to Munshi Saiyid Husain, whose assistance was so valuable to those officers.

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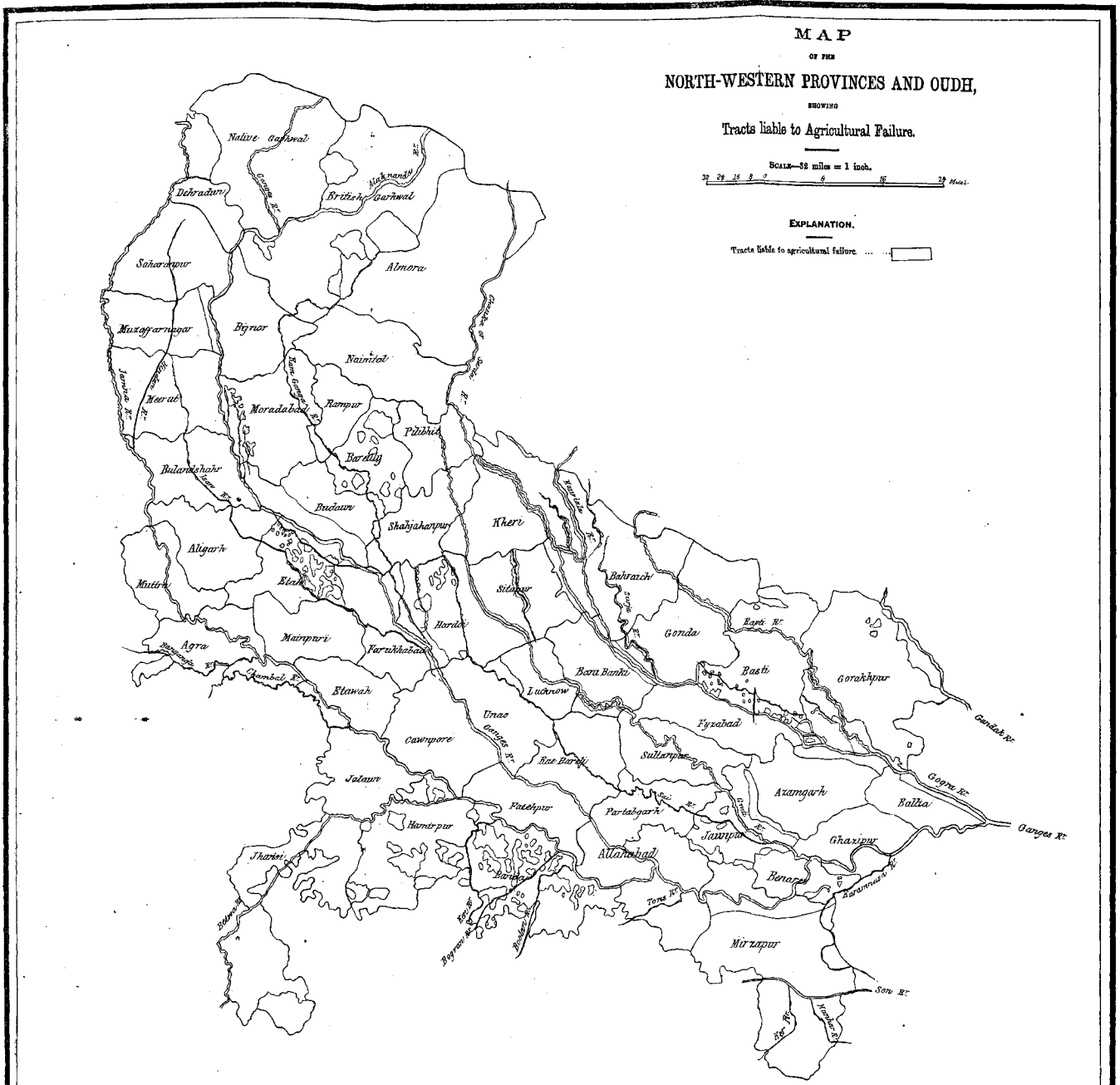
ORDER.—Ordered that a copy of this Resolution be forwarded to the Director of Land Records and Agriculture, North-Western Provinces and Oudh, and that copies of the report and the Resolution be distributed as usual.

J. J. D. LATOUCHE,

*Chief Secy. to Govt., N.-W. P. and Oudh.*

# APPENDIX G.


MAP
OF THE
NORTH-WESTERN PROVINCES AND OUDH,
SHOWING
Tracts liable to Agricultural Failure.
SCALE—32 miles = 1 inch.
32 24 16 8 0 8 16 24 Miles.
EXPLANATION.
Tracts liable to agricultural failure. ... ...
Native Garhwal
Dehradun
British Garhwal
Alaknanda R.
Ganges R.
Saharanpur
Almora
Muzaffarnagar
Bijnor
Naimital
Meerut
Moradabad
Rampur
Pilibhit
Bareilly
Bulandshahr
Budaun
Shahjahanpur
Kheri
Aligarh
Etah
Sitapur
Bahraich
Gonda
Basti
Gorakhpur
Mainpuri
Farukhabad
Hardoi
Agra
Etawah
Bara Banki
Lucknow
Unao
Cawnpore
Fyzabad
Sultanpur
Rae Bareli
Jalaun
Azamgarh
Balka
Fatehpur
Partabgarh
Jaunpur
Ghazipur
Hamirpur
Allahabad
Jhansi
Banda
Benares
Mirzapur
Ganges R.
Gandak R.
Gogra R.
Son R.
Ganges R.
Kanhar R.
Ker R.
Tons R.
Karamnasa R.
Betwa R.
Ken R.
Bogran R.
Bodan R.
Chambal R.
Jamna R.
Hindan R.
Ram Ganga R.
Chauka or Sarda R.
Kaurialu R.
Surja R.
Sai R.
Gnia R.
Bangangla R.
Isari R.

# REPORT

ON THE

# Operations of the Dept. of Land Records & Agriculture,

## NORTH-WESTERN PROVINCES AND OUDH,

*FOR THE YEAR ENDING 30TH SEPTEMBER 1895.*

*ALLAHABAD:*
North-Western Provinces and Oudh Government Press.
*1896.*

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# REPORT

ON THE

# Operations of the Dept. of Land Records and Agriculture,

## NORTH-WESTERN PROVINCES AND OUDH,

***FOR THE YEAR ENDING 30TH SEPTEMBER 1895.***

No. $\frac{540}{\text{VIII-152}}$.

FROM

D. C. BAILLIE, ESQ.,
DIRECTOR OF LAND RECORDS AND AGRICULTURE,
N.-W. PROVINCES AND OUDH,

To

THE CHIEF SECRETARY TO GOVERNMENT,
N.-W. PROVINCES AND OUDH.

*Dated Lucknow, the 13th January* 1896.

SIR,

I HAVE the honor to submit the Annual Report on the work of this Department for the year ending 30th September 1895.

2. Mr. Taylor officiated in charge of the Department from the beginning of the year till the 6th November 1894, on which date he was relieved by the permanent Director, Mr. Miller, on his return from furlough. Mr. Miller held the Directorship till the 5th August 1895, when he made over charge to Mr. Hope, who was relieved by me on the 9th October after the close of the year under report. Saiyid Muhammad Hadi held the post of the Assistant Director throughout the year.

3. In October 1894, Mr. Taylor visited Meerut in order to see the arrangements made for the instruction of patwaris, patwari school teachers and kanúngos in surveying. Mr. Miller soon after taking over charge of the Directorship proceeded to Allahabad to receive orders on some questions connected with the introduction of the system of revision of land-records as a preliminary to settlement proceedings. He then visited the Government Dairy at Aligarh and afterwards proceeded to Meerut, where on the arrival of the camp of His Honor the Lieutenant-Governor the details of the new system for the revision of records were discussed. After inspecting the work that was being started in Meerut he marched to Bulandshahr to inspect the work of the Special Officer engaged in the preparation of the new Parganah Book and connected records. Leaving his camp at Khurja on the 6th December he visited Lalitpur and Bahraich, where survey operations were commencing in order to make arrangements for the programme of work to be carried out in the cold weather. He rejoined his camp in the Aligarh district on the 19th December and marched through the Etah and Budaun districts to Sháhjahánpur, a district which had to be inspected on account of the approaching expiry of the existing settlement. The inspection of this district lasted from 6th to 25th January. Mr. Miller was then recalled to Cawnpore to make enquiries in connection with the Cotton Duties. He was detained there and afterwards at Lucknow, where a conference was held to define the duties and position of the newly appointed Superintendent of Surveys. He rejoined his camp in Kheri on 7th February and inspected that district with a view to the submission of the usual report on its re-assessment. In March and April visits were paid by him by rail to Fyzabad, Azamgarh, Bara Banki, Meerut, Unao, Jhánsi, Lalitpur and Agra to discuss questions that had arisen in connection with the revision of patwaris' circles or the introduction of the new system of survey. In the rainy season the usual Kanúngo

examinations were held by Mr. Hope at Benares, Fyzabad, Gorakhpur and Bareilly. While at Gorakhpur he inspected the work of the Special Officer, whose establishment had been moved to that place from Bulandshahr. Mr. Hope also inspected the Gursikran Usar reserve near Aligarh, the Dairy Farm at Cherat, the Botanical Gardens at Saháranpur, and a few days after the close of the year, the Mutesar nursery in Kumaun.

4. In October 1894, the Assistant Director visited the Dairy and the Usar Reserves at Cherat and Gursikran in the district of Aligarh. In November he was deputed to make out a valuation of the live stock and dead stock at the Cherat Farm before it was leased to Mr. Keventer. He then attended the agricultural show at Etáwah. In December the Assistant Director remained in camp with Dr. Leather in the districts of Lucknow, Bara Banki and Bahraich and assisted him in certain agricultural enquiries he was making. In the third week of December the Assistant Director conducted the examination of the special Kanúngo class at Cawnpore consisting of 67 students. The first three weeks of January 1895 were devoted by him mainly to supervising the elaborate cane-crushing experiment at Cawnpore, Dr. Leather being also present. Towards the end of January the Assistant Director went out into camp to make enquiries into the breeds of cattle found in the districts of Bahraich and Kheri. He finished these enquiries about the middle of March and drew up a report on those breeds illustrating them with photographs. This report has appeared in the Imperial Agricultural Ledger Series and has also found a place in the Dictionary of Economic Products. The report has also in a condensed form appeared in the form of agricultural bulletins of this Department. In the last week of March the Assistant Director attended the agricultural fair at Bindraban (Muttra). In June he again visited Gursikran reserve. In the rains he held the examination of Kanúngos and Amíns at Aligarh, Lucknow and Cawnpore, and assisted Mr. Hope in holding similar examinations at Benares, Fyzabad, Gorakhpur and Bareilly. The Assistant Director also held a special examination of the Kanúngo candidates from Allahabad at Cawnpore in the middle of September 1895. Frequent visits were paid by him to the Usar Reserve at Juhi.

## SECTION I.

### Maintenance of Village Records.

5. A detailed report on the subject of this section appears in the Board's Administration Report. The following important matters may be noticed here.

6. In accordance with the proposals, of which an outline was given in last year's report, a complete resurvey and careful revision of the annual land records of the districts of Meerut and Bahraich and the Lalitpur sub-division of Jhánsi was undertaken during the past year under the charge of professional surveyors trained in the Survey Department of the Government of India. Mr. T. F. Freeman was placed in charge of the work at Meerut, Mr. W. Skilling at Bahraich; and Mr. N. Bedford at Lalitpur. On the 24th of December Mr. G. B. Scott assumed charge of the office of Superintendent of Land Record Surveys in these provinces—a post which it was found necessary to create in order to secure effective professional control and supervision over the different survey parties. The difficulties encountered in the first year of work on the new system were considerable, and Mr. Scott and his subordinates have deserved much credit for the way in which they have been overcome. An area of 2,439 square miles including 1,983 villages and no less than 17,56,668 fields were cadastrally surveyed by the 3 survey parties in 1894-95. No better proof of the success of the system can be desired than that we have in the fact that the average outturn of work done by the patwáris of the tracts surveyed after a single year's training and subject to a strict test for correctness approached nearly to that demanded from the trained amíns of the Survey of India Department. The total number of patwáris and kanúngos, and heirs and relatives of patwáris and kanúngos trained and employed in surveying was 1,009, of whom 235 were kanúngos of districts other than those under survey deputed to

the survey parties for purposes of training. Many of these kanúngos were examined by Mr. Scott personally. Of the whole number of patwáris only 76 were rejected as too old or otherwise incompetent. The patwáris who have received training in the survey parties are now quite capable of keeping their plans up to date in future on a proper system. The total expenditure up to 30th September 1895 including superintendence and cost of instruments has been Rs. 87,338. But of this sum Rs. 26,246 are for instruments and tents which should be carried over 6 years. The actual cost may therefore be put at Rs. 65,468. Adding to this, the sum of Rs. 5,518 on account of Mr. Freeman's pay, which is a provincial charge, the total cost amounts to Rs. 70,986 or an average of Rs. 29-1-8 per square mile. The fact that Mr. Scott's supervision was not paid for during the whole of the year, and that the khasra work was not completed for the whole area surveyed, reduces the cost below what it will be in future years; but the full cost of the resurvey and field work has not so far greatly exceeded that incurred in the revision of survey recently made in connection with settlement in other districts. Mr. Scott's own season's work was a heavy one. He visited all the Survey of India Traverse parties to make the arrangements necessary to secure a full supply of work for his own cadastral parties. He also inspected in detail at least twice the work of each cadastral survey party; and the districts of Kheri, Sháhjahánpur, Bareilly and Azamgarh were also inspected by him in order to examine the state of the settlement maps which were found to be more or less unsatisfactory. He was also in charge of a contour survey of Naini Tal.

7. The re-organization of patwáris' circles and salaries is still in progress in certain districts. The pay of the patwári staff in the Moradabad district has been increased. The scale of pay of the patwáris of the Agra district as proposed in the revised scheme originally prepared having been considered by Government to be somewhat too low, the Board of Revenue have extended the period for the enforcement of the new scheme from 1st October 1895 to 1st October 1896 in order to enable the district officer to consider whether the reduction in the number of circles has in any instances been carried too far, and whether it would not be advisable to raise the rates of pay to some extent. Proposals for certain parganas of the Garhwál district are under consideration. Consideration of those for Sháhjahánpur and Bahraich has been deferred till the survey or settlement operations are over. Proposals for Partábgarh and Unao are still under discussion in communication with the local authorities. In other Oudh districts the revision work will, under the orders of the Board of Revenue, be taken up by the district officers.

8. The annual divisional examination for kanúngoships was held as usual during the rainy season. Out of 152 persons who appeared for examination, 77 passed in all subjects and 73 in part. The candidates were not examined in survey, arrangements having been made for their joining a survey party and obtaining a certificate of their proficiency in surveying from the officer in charge. The special survey school opened at Cawnpore in 1891 has been closed, as there are now several survey parties at work in these provinces, by attendance on which a much better practical education in survey can be obtained than in the school. During the year under report the number of temporary promotions of Kanúngos to Naib Tahsíldárships was 20 as compared with 12 only in the preceding year, but the number of permanent promotions to that post fell from 4 to 1, and that of officiating appointments as Tahsíldárs from 4 to 2. Two Kanúngos were provided with miscellaneous appointments in other offices. To make the kanúngo's post more attractive than at present, the Board of Revenue have ruled that not less than five appointments of Naib Tahsíldárs shall be filled up annually by promotion of subordinate revenue officials, and 5 Kanúngos were accordingly selected for promotion during the year under report.

9. Besides the usual inspection of patwáris' and kanúngos' work in certain districts during the last cold weather, the districts of Sháhjahánpur and Kheri were examined, as a preliminary to settlement, by Mr. Miller, who submitted his reports on the condition of the maps and records and the probable financial result of a new settle-

ment in these districts. The native Inspectors attached to the department inspected the work of the patwári and kanúngo staff in 23 districts with a view to correcting errors of procedure and bringing defects to the notice of the district authorities. The Government of India have now decided that these Inspectors should not be placed under the Commissioners of Divisions as was previously suggested in G. G. O. No. $\frac{1679}{110}$, dated 30th June 1894.

10. Certain changes in rules and procedure introduced during the year may be briefly referred to. In connection with correspondence, which took place with the Government of India, it has been determined to exclude areas in which crops have entirely failed from the area shown as cultivated in the patwáris' papers. The necessary instructions are being issued. A set of rules has also been drawn up for the distribution of patwáris' salaries and keeping their pay accounts. The printing of Mr. Twigg's Manual on Mapping and Mensuration has been completed. In connection with provincial horse-breeding operations special forms for the registration of mares and their produce by patwaris were drawn up on the lines of those introduced in the Punjab, and rules were framed for their use. Assistant Record-keepers having been appointed for the custody of patwáris' papers, arrangements are now being made in all districts in which it is possible to keep patwáris' papers separate from other revenue records. The introduction of the new pargana book and mauza registers has brought about certain alterations in the patwári and kanúngo forms, and the changes that will have eventually to be made in the rules have been embodied in a note which has been submitted to the Board of Revenue for approval.

11. Under G. G. O. No. $\frac{510\text{-}19}{71}$, dated 10th March 1892, lists of survey and boundary marks have been prepared in almost all districts. The marks have also been inspected and steps are in progress for their repairs or re-erection wherever necessary. In the case of boundary marks, the expense of repairs falls on the landlords. Survey marks in Banda, Mirzapur, and Basti have been found to require repairs or replacement, and funds from provincial revenues have been allotted where it was necessary.

## SECTION II.

### Analysis of Districts.

12. Under the orders of Government the detailed results of the analysis of districts is the subject of a section contributed annually to the Board's Revenue Administration Report. The present section therefore refers only to the measures taken to improve the material on which the annual analysis of districts is mainly founded, that is to say, the Pargana books and other records of the economic condition of the different parts of each district. Previous reports have detailed the system on which amended pargana books and mauza registers are being prepared under the supervision of Babu Lachman Pershad, lately Personal Assistant to the Director of Agriculture. In August 1894 the staff maintained for compiling the tahsíl hand-books and the pargana books and mauza registers in the revised form sanctioned by Government was moved to Bulandshahr. During the year under report the hand-books for Bulandshahr and Saháranpur districts and the Mauza registers and Pargana books for Bulandshahr, Saháranpur, and Jhánsi were completed. The expenditure incurred in the three districts is detailed below :—

| | Rs. |
|---|---|
| Bulandshahr ... ... ... ... ... | 4,343 |
| Saháranpur ... ... ... ... ... | 3,853 |
| Jhánsi ... ... ... .. ... | 1,156 |

A portion of the work in these districts was done on the piece-work system, and this system having proved to result in economy has been introduced on a larger scale in Gorakhpur and Basti to which districts the staff was moved towards the close of the year. In Bijnor, Budaun, and Oudh districts now under settlement the Settlement Officers have undertaken the preparation of the Tahsíl hand-books, pargana books and village registers, the forms required having been supplied by this office. Funds so far as under

the Board's orders are necessary have been allotted for the work. In the districts of Partábgarh, Rae Bareli, Lucknow and Unao the work will be finished before the settlement offices are closed. The utilization of the old form of Pargana Book in districts not lately settled has during the year received considerable attention both from district officers and from this Department, but it nevertheless seems probable that it will be necessary to issue more detailed and more explicit orders regarding the way in which these books are to be used.

## SECTION III.

### System of collection of Revenue and Rental in Precarious Tracts.

13. In these provinces this subject is dealt with by the Board of Revenue. In compliance with the orders of the Government of India a table was included in the Annual Report of the Department for the year ending the 30th September 1894 showing the tracts liable to agricultural failure which have suffered during recent years; but under the orders of Government subsequently issued this subject will be dealt with in that section of the Director's report which is submitted to the Board of Revenue for incorporation in their Annual Revenue Administration Report. The Director is now required not to prepare annually a general list of villages, which are liable to agricultural distress from any possible cause, but to indicate the tracts, which have suffered in recent years and especially in the year under report, to investigate the cause of agricultural depression in these tracts, to show what remedies have been applied and to offer suggestions as to further remedial action.

## SECTION IV.

### Measures of Protection including Arboriculture.

14. **Reclamation of Usar land.**—There are three Usar Reserves now under the control of this Department, one situated in the district of Cawnpore and two in Aligarh. The former is maintained chiefly as a fuel and fodder reserve; and of the latter, one that at Cherat, which is partly cultivated and partly kept under grass and trees, has been leased during the year under report to Mr. Keventer formerly in charge, and now lessee, of the Government Dairy at Cherat. At the other reserve at Gursikran in Aligarh the experiments are directed chiefly to determining the results of sowing and planting fuel-producing trees and the effects of enclosure on grass vegetation. There was formerly another reserve at Amramau in the district of Cawnpore in which reclamation of usar land by deep ploughing and manuring proved successful. This reserve was sold out in 1892. An account of the operations carried on at each reserve during the year under report is given below.

15. **Juhi Usar.**—The plain at Juhi has been maintained mainly as a fuel reserve. A few patches of land have, however, been broken for cultivation of cereals. Some of them have yielded a very fair outturn of rice and have been recently sown with rabi crops. They can be easily let at Rs. 5 an acre to the neighbouring cultivators. There is no doubt that the soil at the usar has, by the effect of enclosure, undergone so marked an improvement that cultivation would, if properly carried on, be profitable. The aim of the Department, however, has been not to cultivate but to turn the land into a fuel and fodder reserve. There are hardly any bare patches of usar on the plain now. Fodder operations have not on the whole been successful during the past year. *Sporobolus Pallidus* is still the prevailing grass, and although *Dub* (Cynodon Dactylon), *Janewa* (Andropogon annulatus), *Choloris tetrastachya*, and other good grasses are getting the better of it in many places, the quality of the hay grown on the reserve has been repeatedly pronounced by the Commissariat Department to be inferior; and during the year no more hay was made than was required for the feed of the usar cattle. There is some demand for the standing grass, and a small quantity was sold during the year under report. Considerable attention has been paid this year to the planting and sowing of fuel-producing trees, chiefly *babul* and *dhak*.

*Planting* was carried out on a somewhat extensive scale; *dhak, babul, nim* and *shisham* trees being planted in *thalas* and having been on the whole so far successful especially in those *thalas* in which the trees have been given a start in good earth and manure. Of the older plantings *nim* and *shisham* trees have done best. *Jamans* and plantains have also done well, and experiments are now being made with fruit trees, mangoes and guavas. The tanning trees, *Harra* (Terminalia chebula), *Bahera* (Terminalia belerica), *Aonla* (Phyllanthus Emblica) and Guthar, planted in 1893 have made remarkably good progress. The date palms are progressing slowly. Sixty-two *farash* cuttings were planted this year, only two of which gave off-shoots only to die immediately after. Agave Americana has been extensively planted as a hedge, and the plants are establishing themselves. *Sarpat* grass (Saccharum ciliare) has also been successfully planted on a large scale this year.

*Sowing.*—The plot of ¼th acre sown with *babul* seed last year is now well covered with young trees. During the year under report, the sowing of *babul* and *dhak* seed was tried on a more extensive scale. Four and a quarter acres of land was ploughed up and sown with ordinary *babul* seed and seed obtained from the dung of animals fed on the pods. Of the total area, one acre was originally broken last year and in this piece the germination of seed has been much better than in the area broken this year for the first time, shewing that the more the usar land is tilled and laid open to atmospheric action, the better it is for cultivation of *babul* seeds. Dhak seed sown broadcast early in the rains did very well, but that sown late failed to germinate owing to stagnation of rain water in plots. *Jait* seed (Sesbania Aegyptiaca) sown in *thálas* has germinated, though not freely. The old trees are in good condition making satisfactory progress. A masonry well which was urgently required for the purposes of irrigation is under construction. The total receipts of the reserve up to the end of the year under report amounted to Rs. 558-10-1, and total charges to Rs. 4,552-8-4.

16. **Cherat Usar.**—As reported last year, the Farm and Dairy at Cherat have with the sanction of the Government been leased out for five years to Mr. E. Keventer, the Dairy Expert, with effect from 1st November 1894 on certain conditions, which provide that the land broken up will be maintained in cultivation, and the trees and the grass preserved as far as possible. The usar was inspected by Messrs. Miller and Hope and by the Assistant Director during the year under report. The whole cultivated area including that formerly held by tenants is now entirely cultivated under Mr. Keventer's direct management and trees are planted experimentally, the Department paying the cost of experiments started at its request. Eighteen acres have been newly broken up by Mr. Keventer, of which 10 acres are now bearing a promising crop of transplanted rice, which thrives very well on the low-lying portions of this reserve. Dung manure has been heavily applied to the fields recently prepared for the rabi. A plot of usar formerly absolutely unproductive has been liberally treated with poudrette, and another plot of a similar kind ploughed deeply and manured. Arrangements are also in progress to drain liquid manure into the cultivated area. In the low-lying portions where water has a chance of standing the "batt" grass (Diplachne fusca) has made very marked progress, but it has been grazed down by the cattle. The growth of grass on the usar was this year rather poor owing to insufficient rain. Certain experiments in planting and sowing trees have also been carried out. Trees *planted* in manured soil have been fairly successful but the sowing of seed has been a failure. Inga dulcis and jait seeds (Sesbania Aegyptiaca) recently sown in a ditch filled with good earth manure have germinated well. The *farash* cuttings (tamarix articulata) which were reported last year to be making satisfactory progress dried up in the hot weather of the year under report. *Farash* seed has been recently obtained from the Punjab and supplied to Mr. Keventer to be sown. The date palms are looking remarkably well and their progress is more satisfactory here than at Gursikran, where the soil allotted to them is, however, distinctly inferior. A collection of seed of papilionaceous plants is being made for sowing in this reserve. The Director

of the Botanical Department for Northern India considers that plants of this order are likely to succeed in usar, and the experiment will be tried. The total receipts of the reserve up to the date of the lease have been Rs. 13,182-7-8, and the total expenses Rs. 25,316-0-3.

17. **Gursikran Reserve.**—Nearly 12½ acres of land were broken up during the year under report for cultivation and growing of fuel-producing trees. The cultivated area at present occupied by tenants amounts to about 116 bighas and pays a total rental of Rs. 369-10-0. The rice crop harvested in the beginning of the year gave a fair outturn, but the yield of rabi crops was generally inferior owing to heavy winter rains. The yield of potatoes from a small plot of usar land which was thoroughly ploughed and had received heavy manuring during the past 2 years was as high as 65 maunds per acre, showing how marked an improvement takes place in such land by deep tillage, heavy manuring and proper irrigation. On the uncultivated area *Sporobolus pallidus* is the commonest grass, but the superior grasses *viz.*, *batt* (Diplachne fusca), *dub* (Cynodon dactylon) and *gandar* are getting the better of it especially in and around the depressions. The *gandar* grass, which yields a material used for making brooms and is largely used for thatching purposes, grows well and forms an important source of income at the reserve.

The yield of hay made this year amounted to 13 maunds per acre and the cost price of hay was 8½ maunds per rupee. Here as at Juhi, usar hay has failed as fodder. Cattle do not eat it with relish and experiments made by the Assistant Director show that they prefer even rice straw to the usar hay. Several applications from cattle breeders for permission to graze the standing grass in the rainy season on payment were received but were refused as grazing in that season would be likely to prevent the spread of the better class of grasses.

Silage made from the usar grass was of some use to the usar stock during the cold season, and an attempt will be made next year to produce ensilage on a larger scale. Special attention was paid during the year under report to sowing and planting trees for fuel with results similar on the whole to those already recorded for Juhi. Sowing has been unsuccessful except in land comparatively free from usar salts. Trees planted on the contrary generally do well. The progress of *Jhau* trees (Tamarix Gallica) has been on the whole satisfactory and more have been planted recently. Attempts to grow *Farash* (Tamarix articulata) from cuttings have been almost entirely unsuccessful though much attention was paid to these. On a suggestion from Director, Botanical Department, certain crops belonging to the order *Papilionaceæ* were sown in the kharif on usar land thoroughly ploughed and cleaned, but completely failed to grow, owing in some measure to deficient rains after the sowing. The date palms are making slow but steady progress. Experiments recommended by the Agricultural Chemist to determine (*a*) the weight of dung obtained from a pair of bullocks in course of a year, (*b*) the effect of that quantity of manure on a cereal crop in a given area, and (*c*) the weight of firewood used per family of cultivators, have been started and are in progress, but it is too early yet to discuss their results. The total receipts of the reserve up to the end of the year amounted to Rs. 5,468-15-4, and total expenditure to 10,888-10-10.

18. The Amramau Usar Reserve, which was sold after reclamation, was visited by the Assistant Director during the year. The condition of the soil has further improved owing to heavy application of manure (city sweepings) and persistent ploughing. The scarcity of water is, however, still a serious disadvantage, there being available for irrigation only two small wells, originally made by this department. Even these cannot stand a drain of two hours' duration in a dry season. No arrangement has yet been made by the purchasers to connect the usar with the canal, which runs close by; and unless this is done there seems to be little hope that any marked improvement in the productiveness of the soil can be effected. The last year's kharif crops are said to have given a fair outturn owing to the heavy rains of 1894, which

kept the soil well supplied with water throughout the kharif season, but the yield in the rabi was very poor. During the past kharif rice suffered badly from want of water. The growth of bajra and sugarcane was stunted and a crop of cotton nearly destroyed by the same cause.

19. **Arboriculture.**—A separate report has been submitted to Government on this subject. The following points in connection with it may be summarized here. The actual length of avenues as ascertained from the latest figures furnished by the District Boards was 8,251 miles at the beginning of the year, to which 234 miles of new avenues planted during the year were added. The total length of avenues on the 31st March 1895 was thus 8,485 miles. Of the 1st, 2nd, 3rd and 4th class roads 78, 40, 15, and 5 per cent. respectively of their total lengths are now provided with avenues. The expenditure on district arboriculture amounted to Rs. 71,963 against Rs. 72,279 in the preceding year, and the receipts to Rs. 51,365 as compared with Rs. 57,775. In the majority of districts the Chairmen of District Boards continued to hold the charge of arboriculture in their own hands. But in a few districts either the whole arboricultural operations of the district or those on first class roads only were, under recent orders, made over to District Public Works staff. Whether these transfers of charges are likely to have the effect of improving arboricultural work is a question on which it is now much too early to pronounce any decided opinion.

## SECTION V.

### Agriculture including Experimental Farms.

20. **Cawnpore Experimental Farm.**—The experiments carried on during the Kharif and Rabi seasons of 1894-95 and the results obtained have been described in full detail in the Farm Report issued by this Department separately. The year under report was most unfavorable for experimental work. The rains were excessive (the total rainfall being more than double the normal) and continuing with few breaks to an exceptionally late period. The continuously wet weather damaged the kharif crops in particular and considerably delayed the preparation of the ground for the spring sowings. The outturn in many cases was therefore poor. Among the various nitrogenous and non-nitrogenous manures applied to maize, sheep dung mixed with bone-dust gave very fair results for such an unfavorable season as that of 1894. In an experiment to determine the effect of bone-dust, gypsum and farm-yard manure on indigo, the highest outturn of green stalks was obtained from the plot treated with bone-dust, which is, however, so far a very expensive manure. In an experiment started in 1894 at the request of the Agricultural Chemist to the Government of India to determine the comparative effect of certain mixed mineral and organic manures on sugarcane of the *matna* or the indigenous variety of Cawnpore the highest outturn of *gur* (raw sugar) was yielded by the produce of the plot treated with bone-dust. In certain plots a large number of plants had been laid in consequence of a storm accompanied by heavy rain. The "laid" cane yielded a distinctly lower percentage of *gur* than the 'standing' cane, and the *gur* was also decidedly inferior in quality to that obtained from the 'standing' cane. The percentage of cane sugar was in the case of juice from the 'laid' cane found on analysis to be as low as 8·57, while that in the juice of the standing cane was as high as 17·56, which is, however, an exceptional figure. Ordinarily the percentage of sugar in juice may be taken to vary from 13·5 to 15·5 per cent. The *gur* contained from 70 to 76·5 per cent. of cane sugar, from 10·9 to 14·9 per cent. of water, and from 1·46 to 3·26 per cent. of mineral matter. But in the samples of *gur* from 'laid' cane the percentage of cane sugar was much lower and of glucose (uncrystallizable sugar) much higher than in the *gur* from the standing cane. The Agricultural Chemist remarks that this year's analyses indicate that at least for the *matna* variety of cane it is important to prevent it from being laid by heavy rain and wind. It was also demonstrated successfully that *gur* could be made from the *paunda* canes, which are not ordinarily used for production of sugar in these Provinces. The *paunda gur* contained 75·76 per cent. of cane sugar and was of good quality. Four other varieties

of sugarcane ; namely *dhaul* (Behea), *dikchan* (Sháhjahánpur), *baraukha* (Lucknow and Bara Banki) and *saruti* (Fyzabad) were also tried. The crops suffered seriously from water-logging and were distinctly poor, yet the *gur* obtained from them contained on the whole a higher percentage of cane sugar and a lower percentage of glucose than the *matna gur*. Further trials might therefore show that it would be more profitable to grow these varieties than the *matna*. Of the various manures applied to wheat, the effects of sheep dung applied alone or with other artificial manures were particularly marked. Saltpetre also produced good results. The yield from poudrette was higher than from cow dung. Cow dung mixed with bone-dust produced more grain than cow dung alone. The results corroborate the fact reported in previous years that nitrogen is the most useful fertilising agent for wheat. The yield of different varieties of Khandesh cotton sown before and after rain was poor ; but the results were distinctly in favor of early sowing and tended to show that the country variety was more capable of standing the effects of a bad season and produced a higher outturn than the imported varieties. The experiment to ascertain the comparative vitality and productive power of fresh and old indigo seed was repeated, and the results showed, as in the past year, that old seed though it produced poorer crops was not absolutely unfit for sowing and that the highest outturns of green stalks and seed were obtained from the plots sown with seeds not more than 1 year and 4 months old. Lucerne grown on ridges gave the largest yield of green fodder. Sown in furrows it gave less ; and the least outturn was got from the plot in which it was sown broadcast. The yield of wheat from plots ploughed deep with the 'improved' ploughs was higher than from the plot, which had received shallow ploughings with the indigenous ploughs, and the cost of labor and time required for ploughing was less in the former case. The outturn of Garo Hill cotton, the seed of which had been imported from Assam, was poor owing to the detrimental effects of the unfavorable season, but the bolls produced were much larger in size than those of any other variety tried at the farm. A coarse variety of rice called *baudhan* imported from Assam flourished very well and gave a fairly high outturn. Hill potatoes gave far better results than in the past year and their yield from plots treated with poudrette and castor cake was superior in quality and quantity to the outturn of plots receiving other manures. The seed tubers were obtained from Kumaun. The several varieties of Canadian oats gave as usual a heavy yield of straw but a poor outturn of grain showing that they could be used to the best advantage for raising luxuriant crops of a nutritious green fodder. Egyptian or *barsim* clover (Trifolium alexandrinum) completely failed to germinate although seeds obtained direct from Egypt and those produced at the Farm had both been sown.

21. **Private farms.**—(*a.*) *The Meerut Demonstration Farm*, while under Rai Bahadur Chaudhri Debi Singh, having been managed inefficiently, was made over, on the 1st of July 1894, to Mr. Wyer, the Collector of Meerut, at his request. The services of Muzaffar Khan, an apprentice of the Government Farm, who had in previous years been Superintendent of the Demonstration Farm, were lent to the Collector for one year, the Department agreeing to pay Rs. 25 per mensem towards his salary. Shaikh Wahid-ud-din, son of Shaikh Abdul Karim Khan, C. I. E., Khan Bahadur, of Meerut, came forward with a liberal contribution of Rs. 1,000 to serve as the working capital of the Farm, and in view of his liberality it was proposed to name the farm the "Shaikh Wahid-ud-din Demonstration Farm." The sum originally granted, however, proved insufficient; and the Shaikh advanced a further sum of Rs. 500. The Farm was worked with a total outlay of Rs. 1,500. Experiments were tried in the Kharif and Rabi seasons of 1894-95 chiefly on the lines followed in the Cawnpore Government Farm. The various experiments were effectively carried out. The results were on the whole similar to those recorded for the Government Farm and need not be detailed. The good manurial effects of silt from a sewage ditch adjoining the Farm were

brought to the notice of the neighbouring cultivators and its value is said to have been recognized by them. The question of taking practical measures to extend the use of sewage for manurial purposes among the native cultivators is receiving close attention on the part of the Collector.

In connection with the farm sires are maintained for horse, mule and cattle breeding. An Arab and a Persian Donkey Stallion, a Hissar and a Kanwariya bull and a buffalo bull were available during the past year and their services appear to have been appreciated. Two Kabuli rams and a fine Kashmiri goat will in future also be used for general breeding purposes. Eleven cows, 3 she-buffaloes and a male-buffalo have been recently bought and a dairy started on a small scale. The details of work done in this line have not been reported. The members of the District Board have been taken round the Farm occasionally and appear to be chiefly interested in the breeding operations.

A small seed Depôt is also attached to the Farm. No great quantity of seed has been distributed during the year to cultivators, but it is reported that efforts will be made to extend the operations in this direction.

Dr. Leather, Agricultural Chemist to the Government of India, visited the Farm early in January 1895 and gave written instructions on various agricultural matters. There is no doubt that much useful work has been done by the Farm under Mr. Wyer's management; and in view of this fact Mr. Miller agreed to allow Muzaffar Khan, whom it was intended to withdraw on the 1st of July last, to stay on at the Farm on the same terms as before for the current year. The liberality of Shaikh Wahid-ud-din deserves recognition.

(*b.*) *The Lyall Farm at Ujhauli,* which belongs to Chaudhri Saied-ud-din Husain of Budaun, was recently visited by the Assistant Director. There is nothing special to report about the work done last year at the Farm. Among the various imported seeds tried the yield of red Mexican and white Georgian wheat, of black Tartarian barley, white mustard and China mustard were good in the year under report. Land ploughed with the Watt's and Aikman's ploughs yielded more wheat than that ploughed with the country plough. There are at the farm for breeding purposes one Government donkey stallion and 2 horse stallions.

(*c.*) *Jatau Farm.*—This farm is managed by Kuar Karan Singh, the proprietor. Its area is 112 bighas. It was visited on 24th February 1895 by Mr. Cruickshank, the Collector of Agra. The improved agricultural implements made at the Cawnpore Farm are ordinarily used at this farm. The most interesting work done at the farm appears to have been the trial of the comparative yield of 2 varieties of foreign and 3 of Indian wheat. Muzaffarnagar wheat came off best and is reported to be freely distributed by the proprietor among cultivators for seed purposes. In an experiment with Muzaffarnagar wheat to test the value of certain manures, farm-yard manure is reported to have given the best outturn (661·64 lb per bigha). The arrangements for drainage in the farm are reported to be particularly good and the crops are not therefore liable to damage by excess of rain. The *Bansmati* variety of *Juar* (Sorghum vulgare) is sown at the Farm for fodder. The crop grows to a height of 13 feet and the fodder yielded is excellent.

(*d.*) *Khairandesh Nagar Farm in Sitapur.*—The report received from Lala Sita Ram, the owner of the Farm, is the record of an unfavourable season. Excess of rain is reported to have damaged almost all the experiments at this farm, and the outturn was consequently very low.

*Dhan, Urd, Makka* and *Juar* were sown in the kharif, but with the exception of *dhan* which yielded a fair outturn, the yield of all crops was very poor. The cobs of *juar* were very small, and the stalks proved to be inferior fodder. Of the Rabi crops, the Muzaffarnagar wheat, owing to excessive rain, gave a very poor outturn, the grain being very thin. The outturn of oats this year was, however, greater than that of previous years. The farm extends over 50 bighas of land and is provided with an establishment of 16 men. The tillage operations are carried on by means of improved implements.

22. It appears to be a matter for regret that the number of demonstration farms in the province is so small and that so far the connection of the managers of these farms with the Agricultural Department has not been so close as might be desired. I propose to bring to the notice of the Board of Revenue the advantage of instituting such farms in the wealthier Court of Wards estates. Working plans for each farm suited to its situation and extent will be drawn up by the Assistant Director with the assistance, it is hoped, of the Agricultural Chemist to the Government of India. There is, it appears to me, much useful work, which could be done by Court of Wards farms. More especially in connection with the demonstration of the advantage of using seed of selected kinds there is for such farms a wide field of usefulness. It is possible that in regard to the improvement of the fodder supply they might also do good work. There can be little doubt that for many of the subsidiary crops grown in different parts of the province seed from some districts may be shown to be greatly superior in yield and produce to seed from others. In regard to sugarcane such experiments are now going on at the Government Farm. Many of the minor crops though locally very valuable have not yet been experimented on and scattered experimental farms would undoubtedly be valuable in bringing to notice different varieties of seed.

23. **Government Gardens.**—(*a.*) *Saháranpur Garden.*—The season was not a very favourable one for the garden owing to the excessive rainfall during the monsoon months of 1894 and exceptionally cold and wet weather during the following January and February. The fruit harvest especially that of mangoes was, therefore, poor; and the commercial operations of the gardens were on a somewhat smaller scale than in the previous year. In other respects the year's working was satisfactory. Considerable improvements were effected in the appearance of the garden; and experiments of some value in the cultivation of fodder and fibrous plants carried out. The direct and indirect receipts of the garden amounted to Rs. 24,275 exceeding the expenditure by Rs. 1,033. Mr. Gollan, the Superintendent of the garden, whose services have been secured by Government for a further term, was on six months and 3 days' furlough out of India during the latter portion of the year under report. In his absence Mr. F. W. Seers managed the garden in a thoroughly satisfactory manner. Mr. Ridley, Superintendent of the Lucknow Gardens, at the instance of Mr. Miller, and Mr. Hope, while officiating as Director of this Department, both visited the Saháranpur Garden during the period of Mr. Seers' management. The demand for trained gardeners continues to be in excess of the supply. The experiment of training boys as gardeners on release from the Bareilly Reformatory was tried. Three boys were received of whom one is still in the garden and doing fairly well. The other two left the garden—one for a higher appointment and one for home. As in previous years excellent work has been done by Mr. Gollan in this garden in acclimatizing various varieties of foreign fodder, fibre and fruit plants, several of which have shown themselves well suited for cultivation in these provinces, and in all probability require only to be better known to be appreciated.

(*b.*) *Lucknow Garden.*—Great damage was done to the Horticultural Gardens at Lucknow by the exceptionally high floods of the Gumti in the autumn of 1894, which killed off a large number of young trees and other plants in the gardens and greatly reduced the stock of seed from autumn plants, which was available for sale in the beginning of the current year. The yield of fruit was not good and the attempt to introduce new varieties of strawberry proved a failure. On the other hand great success was obtained with a variety of plum from Saháranpur ; and the Mauritius *ber* (Zyzyphus jujuba) trees are also doing well. The receipts amounted to Rs. 13,050 ; and the expenditure to Rs. 15,800, as compared with Rs. 13,271 and 15,500 respectively in the previous year.

(*c.*) *Khusru Garden, Allahabad.*—The receipts and expenditure at the Khusru garden, Allahabad, fell from Rs. 2,835 and Rs. 4,000 in 1893-94 to Rs. 2,367 and Rs. 3,990 in 1894-95. The decrease in receipts is reported to be chiefly due to the failure of the mango crop. This garden as well as the Botanical gardens at Saháranpur and Taj gardens at Agra was visited by Mr. Duthie, who submitted to Government his inspection report separately on them.

(*d.*) *Taj Gardens, Agra.*—The expenditure during the year amounted to Rs. 15,992 and the receipts to Rs. 4,715 as compared with Rs. 15,777 and Rs. 3,318 respectively in 1893-94. The gradual increase in receipts is a satisfactory feature of the garden management, and is due in a great measure to the personal energy of the present Superintendent, Mr. Bullen, whose appointment as head gardener promises to prove a success.

(*e.*) *Mutesar Garden in Kumaun.*—The record of work done at Mutesar during the past year is slight. The late Superintendent lived at a distance from the gardens and only visited it occasionally ; and the working was therefore less satisfactory than it is hoped it will prove under the management of Mr. M. K. Bamber, Assistant Bacteriologist to the Government of India, whose residence near the garden has been taken advantage of to secure his superintendence for it.

## SECTION VI.

### Introduction of Agricultural Improvements.

24. **Agricultural shows.**—Agricultural shows were held at Kakora (Budaun), Etáwah, Rampur, Khairabad, Aligarh, Bulandshahr, Muzzaffarnagar, Meerut, Muttra, Gola Gokaran Nath and Bahraich. The Director was himself present at the Nauchandi fair in Meerut. At the Etáwah and Muttra fairs the Department was represented by the Assistant Director, who gave lectures on agriculture and judged prizes. The remaining shows were attended by the Farm apprentices. Ploughing competitions were held at all the fairs, and, in the majority of them, the highest prizes were taken by either the Watt's or the " Improved Baldeo " plough introduced by this department. At Muzaffarnagar the Baldeo plough met with the unqualified approval of the Judging Committee and was awarded a prize of Rs. 15. It has been reported in previous years that agricultural shows afford to the department the best opportunities of demonstrating to the agricultural public, the usefulness of improved implements and of selling them, but the success of these demonstrations depends, to a great extent, upon the presence at the shows of superior officers of the department, which is not always possible. There is otherwise danger that the interest of the persons present be not attracted to the implements shown. In many cases the arrangements made by the fair committee are hardly such as to secure full display of the value of the exhibits. Chain pumps cannot be properly exhibited without a water-supply, cane pressing machines without an ample supply of cane, and

yet water and cane are frequently unattainable in the quantities required. In regard to the implements exhibited the usefulness of the department has been to a considerable extent curtailed by want of funds to secure for trial or exhibition implements of the best description. Cheap implements such as tenants could purchase are shown; but wealthy zamindárs frequently consult the department in regard to the best form of implements that can be recommended particularly in regard to pumps. The largest number of implements were sold at Muttra, where the Collector heartily co-operated with the Assistant Director in bringing them forward to the notice of the zamindárs. Great improvement is reported to have been effected during the year in the management of the agricultural section of the fair at Muzaffarnagar. There was a falling off in the number of cattle exhibited at this fair as compared with the previous year, owing possibly to the prevalence of cattle disease in the district. Agricultural lectures dealing specially with the subject of cattle disease were delivered at the show. The largest number of cattle was exhibited at Aligarh, and of samples of agricultural produce and implements at Muzaffarnagar and Bulandshahr, in which latter district certain cultivators of fair means have, as a result of demonstrations made in the past years, adopted improved implements for ordinary use. The cattle exhibited at Meerut, though few in number, are reported to have been remarkably fine and a 4-roller sugar mill shown by Mr. Jones of Nahan is said to have been "apparently a great improvement on the existing mills."

The fair at Gola started by Colonel Harrison three years ago, though a very small one, is of great importance in being held at a place where specimens of the famous breeds of cattle of the Kheri district are shown and sold; and is deserving of special encouragement as likely to be conducive to improvement in those breeds.

25. **Distribution of Implements.**—The following statement shows the distribution of implements during the past 2 years:—

| Name of implements. | 1893-94. | | | | 1894-95. | | | | Increase. | Decrease. |
|---|---|---|---|---|---|---|---|---|---|---|
| | Sold. | Trial. | Hire. | Total. | Sold. | Trial. | Hire. | Total. | | |
| Ploughs ... | 339 | 11 | 16 | 366 | 76 | 19 | 30 | 125 | ... | 241 |
| Chain pump ... | 30 | 4 | 5 | 39 | 11 | 1 | 3 | 15 | ... | 24 |
| Grain kibbling mills, | 17 | 4 | ... | 21 | 19 | 1 | ... | 20 | ... | 1 |
| Chaff-cutters ... | 8 | 4 | ... | 12 | 9 | ... | ... | 9 | ... | 3 |
| Flour mills ... | ... | 1 | 1 | 2 | ... | ... | ... | ... | ... | 2 |
| Sugar pans ... | 2 | 1 | ... | 3 | 1 | ... | ... | 1 | ... | 2 |
| Dredgers ... | 1 | ... | 3 | 4 | ... | 2 | 5 | 7 | 3 | ... |
| Boring apparatus ... | ... | 3 | ... | 3 | ... | 7 | 1 | 8 | 5 | ... |
| Baldeo water lift ... | 1 | ... | ... | 1 | 1 | ... | ... | 1 | ... | ... |
| Harrow ... | ... | ... | ... | ... | 1 | ... | ... | 1 | 1 | ... |
| Furnace fan ... | ... | ... | ... | ... | 1 | ... | ... | 1 | 1 | ... |

There has been a decrease in distribution under the first 6 heads of the above statement. In 1893-94 there was an unusual rise in the number of implements sold, owing mainly to the special efforts made by the Assistant Director in connection with the agricultural shows he visited. During the year under report he was able to be present at only two fairs. The Baldeo plough as noted in the past year's report appears to have given satisfaction to a number of cultivators in the Farukhabad district, whence 2 of them came to the farm to purchase ploughs. It has since been improved and appears likely to be popular. The Watt's and Baldeo ploughs were sent as far as Peshawar and Quetta in the Panjab, and Calcutta and Dacca in Bengal. The fact that 30 improved ploughs were hired chiefly by the common cultivators in the neighbourhood of the Cawnpore farm is a fair indication of their usefulness and efficiency for some classes of work. The efficiency of the chain pump for canal and tank irrigation is fully recognised by persons who have given it a careful trial. It continues to be hired by cultivators round the farm. Attempts made to sell the pump on the

hire system introduced in accordance with a wish expressed by the Local Government in 1892 have been only partially successful. During the year a pump was indented from Patiala in the Panjab. There has been a small rise in the sale of grain kibblers and chaff-cutters, but only one of the former and none of the latter were given on trial. The Baldeo Balti contrived for raising water for a very short lift as from a canal has recently been improved upon by the inventor and one was indented for during the year by the Charkhari State.

26. **Distribution of seed.**—The subjoined table compares the quantity of various kinds of seeds distributed in the past 2 years: —

| Name of seed. | 1893-94. | 1894-95. | Remarks. |
|---|---|---|---|
| | lbs. | lbs. | |
| Wheat ... ... | 11,645 | 12,054 | |
| Barley ... ... | 1,025 | 5 | |
| Oats ... ... | 11,745 | 13,668 | |
| Peas ... ... | 82 | ... | |
| Sorgham ... ... | 212 | 50 | |
| Lucerne ... ... | 58 | 71 | |
| Guinea grass ... ... | ¼ | ½ | |
| Mangel ... ... | 20 | ... | |
| Turnip ... ... | 2 | ... | |
| Reana grass ... ... | 8 | 10 | |
| Egyptian clover (Barsim) ... | 61 | ... | |
| Bajra ... ... | ... | 451 | |
| Arhar ... ... | ... | 574 | |
| Indigo seed ... ... | ... | 164 | |

There was some increase under wheat and oats during the year under report. The wheat figures include a heavy item of 50 maunds indented for by Thakur Mahabir Parshad Narain Singh, Rai Bahadur, of Baraun (Allahabad), for local distribution. Bajra and arhar were supplied to Burmah and the indigo seed to a private gentleman in Hardoi. The demand for lucerne has been steadily increasing and that for Reana Luxurians, which has been produced at the farm during the past 2 years, is growing. The demand for Guinea grass seed is higher than the farm is at present capable of meeting from its own produce or purchased stock. The roots of that grass are, therefore, also supplied if asked for. No indents were received for peas, mangels, turnip or Egyptian clover during the year under report and there was little demand for barley.

27. **Agricultural Association and Local Associations.**—No meeting of the Provincial Agricultural association could be arranged for during the year under report.

The Porter Agricultural Association of Baraun (Allahabad) held a meeting on the 6th June 1895, in which members agreed to try and give prominence to the Porter plough invented by the Secretary Rai Bahadur Mahabir Parshad Narain Singh, which had after trial received the commendations of the Assistant Director.

Referring to the agricultural work of the year 1302 fasli the Secretary remarks that the crops were so seriously damaged by excessive rains that the results are not worth reporting. The Secretary has recently obtained through this Department a supply of 50 maunds of Muzaffarnagar wheat for distribution by the association among cultivators. No report has been received from the Bijnor Agricultural Association.

28. **Agricultural Journal.**—The Journal has been issued during the year under report to subscribers from the Punjab, Rajputana and the Central Provinces besides those from the North-Western Provinces and Oudh. The total number of copies now issued is 392 as compared with 300 issued last year; and the increase has more than made up the decrease noticed in the last year's report. No change has been made in the nature or arrangement of matter published in the journal. A Hin di

edition of the journal has been brought out by the Manager of the Lucknow Printing Press under his own supervision and management. The number of subscribers to this edition on the 30th September 1895 was 34. The Hindi issue has not, therefore, so far been financially a success, but the venture is one to which the support of the department may fairly be given; and it is hoped that a larger circulation may be secured for it. It may prove of special value in connection with the possible extension of agricultural education to village schools, which is now under consideration. The total receipts from subscriptions for the Urdu journal during the year under report amounted to Rs. 244-8-8 and the cost of publication to Rs. 360.

29. **Boring apparatus.**—Experimental borings were taken this year in the districts of Budaun, Bareilly, Aligarh, Etah, Muttra and Cawnpore. In Cawnpore the experiments were made at the request of the Public Works Department in connection with the extension of the Ganges Canal now in progress. The total number of borings during the year under report was 86 as compared with 36 in 1893-94, showing a considerable increase over the past year. Applications from private individuals for the services of well sinkers were received in so large a number that it was impossible to comply with them all, the department having only two well sinkers at its disposal. A further impetus to the already increasing demand was given by the Commissioner of Kumaun, who asked for the services of a well sinker to take trial borings in the Kumaun Bhabar. An extra well sinker was, therefore, entertained by the department lately, and the 3 well sinkers are fully occupied with work at present. The salary and travelling allowances of the well sinkers for the period of their work and the freight of boring implements are paid by the individuals, who engage their services; and the department pays them for the short intervals (if any) during which they have either to work for the benefit of Government or are not employed by private applicants. The department also keeps spare sets of the boring tools for lending out to private persons on certain conditions. The total charges met by Government on account of purchase and repairs of implements and of railway freight &c., amounted to Rs. 51-4-9 during the year under report. There is no doubt that the employment of these well-borers has a value to the provinces considerably more than proportioned to the very small expenditure, which their employment imposes on the Government. The fact that their services are available is not widely enough known; but measures will be taken to remedy this.

## SECTION VII.

### Registration of Traffic.

30. The following traffic was registered during the year 1894-95.

(1) Foreign traffic with Tibet and Nepal.
(2) Rail-borne traffic.
(3) Inland road traffic.

31. **Foreign traffic.**—The traffic of these provinces with the countries of Tibet and Nepal is shown in the following table:—

| Direction of traffic. | Weight in maunds. | | Value in rupees. | |
|---|---|---|---|---|
| | 1894-95. | 1893-94. | 1894-95. | 1893-94. |
| | Mds. | Mds. | Rs. | Rs. |
| **Imports—** | | | | |
| From Tibet | 52,712 | 70,263 | 6,36,066 | 7,13,425 |
| From Nepal | 18,41,535 | 16,73,333 | 52,12,043 | 49,94,339 |
| Total | 18,94,247 | 17,43,596 | 58,48,109 | 57,07,764 |
| **Exports—** | | | | |
| To Tibet | 47,148 | 41,865 | 2,47,032 | 2,77,541 |
| To Nepal | 2,14,598 | 2,29 560 | 39,66,927 | 30,26,913 |
| Total | 2,61,746 | 2,71,425 | 42,13,959 | 33,04,454 |

*Tibet.*—The trade with Tibet is of little importance; and the annual fluctuations cannot be explained without more information than the Department possesses regarding the circumstances of the traders and of the country from which they come. As compared with last year there has been a great falling off in the import of salt; and the trade in wool, which special efforts were made to stimulate a few years ago, also shows signs of a decline. The total imports were below those of last year both in amount and value. The weight of exports to Tibet has slightly risen owing to increased exports of grain and sugar, while a decrease is noticeable in the value mainly owing to diminished exports of cotton goods and silver.

*Nepal.*—In the two previous years the import trade with Nepal had sunk to an unusually low figure. In the year under report there has been a slight recovery; though the trade is still in amount and value much below the average of the last ten years. The two chief articles of import from this country are rice and timber. There was a falling off in the year under report in the quantity of rice imported owing, it is said, to the necessity of keeping supplies in the country for a tour of the Raja in the western lowlands of Nepal. The timber trade on the other hand increased, and is stated to be due to the restrictions placed on the trade having been relaxed or removed; but it must be some time before the trade fully recovers and it is not improbable that the forests are no longer able to yield the larger quantities imported a few years ago. The most valuable of the exports to Nepal are cotton goods, the quantity of which exported during the year under report was about 33 per cent. in excess of the exports of the previous year. Chiefly in consequence of this the total value of the exports rose from 30 to 39 lacs of rupees. No imports of silver have been recorded during the past two years. It has been ascertained from the Collector of Basti, in which district the import took place in 1892-93, that as a matter of fact silver is still imported from Nepal in the form of rupees. These imports were formerly shown in the traffic returns as of silver; but though rupees are still imported they are not now registered as silver.

32. **Rail-borne traffic.**—The rail-borne traffic registered during the year compares as follows with the trade of the previous year:—

| | 1893-94. | | 1894-95. | |
|---|---|---|---|---|
| | Mds. | Rs. | Mds. | Rs. |
| Imports ... ... ... ... | 2,56,79,962 | 13,67,10,073 | 3,94,76,973 | 15,59,26,358 |
| Exports ... ... ... ... | 2,77,47,587 | 18,58,10,580 | 2,67,24,171 | 20,09,51,497 |

The export trade of the province fell by 3½ per cent. in weight as compared with the previous year; while the value thereof rose by 8 per cent. The increase in the value of exports is due partly to an increase in the export of the more costly articles, such as cotton and woollen goods, hides and skins, wheat, shell-lac and leather manufactured, and partly to a higher value having been assigned to opium. The decrease in the volume of the export trade is principally due to diminished exports of raw cotton, grains other than wheat, oilseeds and sugar. The exports of wheat show a slight increase from 31 to 37 lakhs of maunds, but the imports thereof at the same time rose from 11 to 31 lakhs of maunds; the net exports of wheat being 6 lakhs of maunds as compared with 20 lakhs of maunds in the preceding year. The import trade of the province increased by about 54 per cent. in weight and by 14 per cent. in value as compared with the preceding year. There was some falling off chiefly in the imports of metals, cotton goods and salt, but on the other hand there was a very considerable increase in the imports of grains. The imports of all kinds of food grains amounted to 174 lakhs of maunds, a larger figure than it ever before reached since the registration of rail-borne traffic commenced, and equal to the total imports of food grains during the last five years. The statistics of trade show a marked decline in the agricultural resources of the Provinces owing to a succession of unfavorable seasons. The

indifferent harvests of 1893 had necessitated an import of food grains from neighbouring provinces to the extent of 38 lakhs of maunds. The crops of 1894 were poorer than those of the preceding year and the home supply of food grains was still more insufficient for local consumption. Fortunately the harvests in the Panjab were again exceptionally plentiful, and were it not for the large importations of grains from that province, there would have been very considerable distress in Oudh and the Rohilkhand, Allahabad, Benares and Gorakhpur Divisions.

33. **Road traffic.**—On the completion in April 1894 of three years' traffic registration in the eastern districts of the province the staff of the registration establishment was moved in May following to the Rohilkhand Division and the districts of Meerut and Naini Tal. The collection of trade statistics in this part of the province is required partly in compliance with the wishes of the Public Works Department, which had intimated that the construction of certain branch lines of railway was under consideration, and partly with a view to ascertain the trade and resources of the Rohilkhand Division, as directed in the Government of India's Circular No. $\frac{18}{32-5}$, dated 9th July 1890. The first year in which statistics were collected was not normal as the seasons were bad, and grain instead of being exported was imported in very large quantities. The statistics collected do not therefore represent the average capacities of the tracts concerned; and it will be necessary to maintain the posts for some time more till statistics relating to the flow of trade and the resources of the districts concerned in ordinary seasons have been collected.

34. An Inspector of Traffic attached to the Department was deputed to the districts in the Meerut and Rohilkhand Divisions to make enquiries into the state of the principal indigenous handicrafts carried on in these districts; and some interesting information was collected as to the number of persons employed on such manufactures and their earnings. A summary of the information collected by the Inspector was given in Appendix D to the annual report of the Inland Trade for the year ending the 31st March 1895.

## SECTION VIII.

### Promotion of Horse Breeding Operations through Civil Agency.

35. Veterinary-Major Rayment was in charge of the Department during the first three months of the year ending the 31st March 1895. He attended the Hardwar Fair and Nauchandi show, inspected the Saháranpur-Rajpur dâk line and was on the Board of Examiners, Lahore Veterinary College. In July 1894 he was succeeded by Veterinary-Lieutenant Loughlin, who inspected the Imperial and Provincial stallions, attended seven shows, was at the Saháranpur-Rajpur dâk line on two occasions, accompanied the Imperial Bacteriologist whilst investigating the outbreak of *Surra*, visited Bombay for the purpose of purchasing pony stallions and submitted three separate reports, one on the Provincial and two on the Imperial Military and Revenue sections of his work.

36. The efforts of the Provincial Department since its establishment have been directed to supplementing operations of the Imperial Department by providing a less expensive class of sires with a view to the improvement of stock where good brood mares are scarce. During 1894-95, the number of Provincial stallions rose from 30 to 49 and the number of those purchased for Court of Wards estates or by private persons from 15 to 19. Government bore two-thirds of the cost of all the stallions issued except two, the full cost of which was met by private persons. There were no complaints regarding the stallions issued. The number of mares reported to have been covered by Imperial and Provincial stallions was 3,041 and 1,957 respectively. At the end of the year there were 37 applications for Provincial stallions uncomplied with. Only one donkey was bought from Provincial Funds. More could not be had within the year as the Arab horse dealer with whom arrangements were made last year failed to procure them. The Imperial donkey stallions covered 3,550 pony mares and 56 donkey mares.

37. During the year 1894-95 outbreaks of cattle disease were reported from 21 districts. Serious outbreaks of *Surra* occurred on the dâk lines to Mussoori and Naini Tal and a few cases of glanders were also reported. Lieutenant Loughlin visited the Saháranpur-Rajpur dâk line and during his tour in other districts inspected several affected animals and advised their owners as to their isolation, disinfection &c. Veterinary assistants, of whom now are fifteen, were also employed in dealing with cattle disease. A number of cattle and horses were also treated at the small dispensary started experimentally at the Cawnpore Farm and placed in immediate charge of a Veterinary assistant, who has undergone a short course of practical training at Babugarh. The Assistant Director generally supervises the work of this dispensary.

38. During the year under report a Kanwaria bull was obtained by the Department for the Collector of Meerut and 3 cows and one bull of the Kosi breed for Raja Rámpal Singh, Taluqdar of Kálakánkar in the Partábgarh district. A young bull of the Kosi breed and an Arab stallion are also kept at the Cawnpore Farm. Coverings are allowed free. The Farm Kosi bull covered 41 cows and the horse stallion 43 mares in the year.

39. The Assistant Director has for the last two years been employed during a part of the cold weather on special enquiries regarding cattle breeding. In 1893-94 Muttra district was dealt with and in 1894-95 an exhaustive report on the various breeds of cattle found in the extensive grazing grounds of Kheri and Bahraich was drawn up after full enquiry into the system of breeding followed. The reports were forwarded to the Special Assistant to the Inspector-General and extracts from them are being published in a series of agricultural bulletins for general information.

40. The arrangements for the establishment of a Provincial Veterinary College having fallen through, the sanction of Government has been accorded to a proposal to send two men annually to the Lahore Veterinary College to be educated after giving them one year's practical training at Babugarh.

## SECTION IX.

### Miscellaneous.

41. **Dairies and dairy farming.**—The account of dairy experiments was brought down last year to September 1894. In November 1894, the Cherat dairy near Aligarh was leased to Mr. Keventer, the Swedish expert, who had previously as a Government employé been in charge, for the period of five years at an annual rent of Rs. 900 payable each year on the 1st of November. All the dairy stock including dairy appliances, live stock, &c., was sold to Mr. Keventer for Rs. 8,240 to be paid by him within 18 months from the 1st November 1894.

The outstanding debts of the dairy due to Government have for the most part been collected and there remains only a comparatively small item of Rs. 59-10 still unpaid for the recovery of which steps have already been taken. There are now dairies in most of the large cantonments, but the demand for butter from Aligarh according to the latest accounts shows no signs of falling off. Butter has been sent from there as far as Poona, Calcutta, Darjeeling and Quetta. There can be no doubt that Mr. Keventer and the Aligarh dairy have made it possible to obtain, not only at Aligarh but at various other dairy farms subsequently started, butter of a quality, from a European point of view, which it was not previously possible to obtain in India.

42. **The Agricultural School.**—The class of students that was formed in July 1893 completed its course of two years' study at the school and had its Final Examination in April last. Dr. Leather undertook the Examination in Agriculture, Chemistry and Agricultural Chemistry; Mr. Scott, the Superintendent of Land Records Surveys, in surveying; Mr. Thomson, Principal, Agra College, the Botany paper; and Mr. Miller the Botany *viva voce*. The acquirements of the students in Botany and surveying were considered good by the respective examiners; and in Agriculture, Chemistry and Agricultural Chemistry Dr. Leather made a very favorable report on

the results of the examination and the manner in which instruction is imparted at the school. His report forms an appendix to this report. Eighteen students appeared at the Final Examination, of whom 17 passed, 14 in the first division and three in the second division. For two of the optional subjects of the School Final Examination of the Allahabad University held in April 1895 *viz.* (1) Agriculture with surveying and (2) Elementary Physics and Chemistry, all the 35 students in the school appeared, of whom 32 passed in both the subjects. Of the remaning three one failed in Agriculture with surveying, and two in Elementary Physics and Chemistry. The senior students *i.e.*, those who have passed out recently cultivated a quarter of an acre each and sowed oats, all operations of cultivation being done entirely with their own hands. The second batch of students *i.e.*, the present senior students, have planted sugarcane of the *paunda* variety on 121 square yards each and have sown oats on ¼ acre each in the rabi. Both passed out students and to a still greater extent those now at the school take much interest in their field work and perform the several field operations cheerfully and willingly. The plot cultivation is a decided success and is one of the most interesting features in the work of the school.

Mr. Welby, Inspector of Schools, III Circle, inspected the school in December 1894 and made a very favorable report on the work of the school. In January Dr. Leather visited the school and left very favorable remarks on the Visitors' Book as to the method of teaching and the general work done at the school. An agricultural students association has been working almost ever since the commencement of the school with the object of improving the general and agricultural knowledge of the members. Gymnastics are made a regular part of the school course, but there is no regular trained instructor. Foot-ball, an every day sport at the school, the out-door classes in Agriculture, Surveying and Botany and the plot cultivation give enough physical work to keep students in good health. A new class was formed in July last, in which there are 14 students, all candidates for Kanúngoships, of whom three are Brahmins, two Rajputs, one Bhuinhar, six Kayasths, one Halwai and one Mahajan. Three of these have passed the Entrance Examination of the Allahabad University and the rest the Anglo-Vernacular Middle Class Examination. In the second year's class there are at present studying 17 students all of whom except one passed the Examination for promotion held in April last. The majority of the 17 students that were successful at the Final Examination of the school are reported to have got employment as Kanúngos or apprentice Kanúngos in the districts from which they came. Four have been engaged in this Department. None of the passed students have yet been taken into Court of Wards service in which there is undoubtedly a field for their employment.

The special Kanúngo class attached to the school was formed once in the year and lasted from the middle of August to the middle of December. There were in all in the class 65 candidates. These and four candidates of the Agricultural school appeared in the Kanúngo Examination held at Cawnpore about the close of December. Twenty-eight candidates passed in all subjects, the rest failed in one or more subjects. This class has been discontinued for reasons which have already been stated.

43. **The Lucknow Museum.**—The total number of additions made to the various sections of the museum during the year under report amounted to 1,586 as compared with 2,485 in the previous year. Of these 430 specimens were obtained by purchase, one by exchange, 124 were collected by the museum staff and 1,031 presented by various persons. The principal additions were made to the Numismatic section, which received 832 coins by presentation during the year. Out of these some of the copper coins were of the date 150 B.C. The number of visitors was 174,240 including 830 *Pardanashín* women and was somewhat in excess of the average of the last two years.

European and American travellers regularly visit the museum as one of the places of interest in Lucknow, and its popularity seems to be equally established amongst the

native visitors. The actual expenditure was Rs. 9,326; and as receipts to the amount of Rs. 1,656 were paid into the treasury, the actual cost to Government was only Rs. 7,670.

44. **Sericulture.**—Under the orders of Mr. H. Z. Darrah, while officiating as Director, some live cocoons of eri-silk-worm (Altacus Ricini) were obtained for rearing purposes from Assam in June 1894. The silk worms were reared at the farm and fed on the leaves of castor-oil plant. They produced five cycles up to the beginning of April last and thrived well until then, yielding cocoons similar, and even superior in quality to those obtained from Assam. The experiment, however, ended with the arrival of the hot weather. The moths that emerged from the cocoons in the beginning of the hot season died in considerable numbers before laying eggs. Those that escaped death at this stage laid very few eggs, and the worms that emerged from them died altogether in course of a week. Cocoons and worms had also been distributed for rearing to private persons in the neighbourhood of the farm and in Lucknow, and with them too all the worms died by the 10th of May 1895. The high temperature of the plains of these provinces in April and May is obviously a serious difficulty in the matter of establishing this industry and it remains to be seen how, if at all, it can be got over at a reasonable cost. To resume the experiment, a fresh supply of 100 live cocoons was obtained from Assam towards the end of August last. The moths came out as usual and laid eggs which produced 1,400 worms. These were, however, sickly and dull. The weather was hot and artificial measures were taken to keep as low as possible the temperature of the various rooms, to which they were shifted one after the other. A disease broke out, in consequence of which they died in large numbers. Only 779 cocoons weighing 20 ounces were in all obtained from this brood. The second cycle is still in the primary stage; and the worms which are the progeny of unhealthy parents, are sickly in appearance. Steps are being taken to procure fresh seed again from Assam.

45. **Crop experiments.**—Since the spring harvest of 1894 an annual system of crop cuttings has been introduced in these provinces under the orders of the Government of India, who in order to give effect to the wishes of the Secretary of State issued instructions for the submission of a quinquennial return showing for each district the average yield per acre of each of the principal crops to be based on information collected every year by actual experiments. The next quinquennial return is due to the Government of India in July 1897; but the results of the experiments made in connection with the spring and autumn harvests of 1894 were reviewed in a note, which was circulated to district officers for the information of experimenting officers. Cuttings were also made in the spring harvest of 1895; and a note reviewing the results obtained is in press.

46. **Forecasts of crops.**—Two forecasts on the indigo crop and three on each of the cotton, gingelly, wheat, linseed and rapeseed crops were issued as usual during the year under report. The area statistics under the various crops are obtained from the crop returns filed by the patwaris, while the condition of crops is judged from the reports received from selected zamindars on a system introduced several years ago. Since August last a monthly report on the agricultural prospects of the province based on the reports received from districts is issued by the department and published in the Gazette under the orders of Government. A collection of the circulars and instructions issued regarding crop forecasts was made and printed for future reference. A similar collection of the orders defining the general duties entrusted to the department was also made and printed.

47. **Departmental publications**—During the year under report the third and concluding part of "Field and Garden crops of the N. W. Provinces and Oudh" was issued under the authority of this Department. Volumes I and II of this valuable work, which were compiled by Messrs. Fuller and Duthie while serving under this department, were published in 1882 and 1883. The third volume was entirely compiled by Mr. Duthie, Director, Botanical Department, Northern India.

48. **Specification of Inventions.**—Eighteen applications for leave to file specifications of inventions were received for opinion during the year from the Government of India. They were examined by the Assistant Director, who recorded his opinion about the novelty and utility of each.

49. **General.**—I have been for so short a time in charge of the department that it would be premature to pronounce any decided opinion of my own regarding the merits of the different officials employed in it. Mr. Miller has recorded his high appreciation of the work done by the present Personal Assistant; and I am glad to express my conviction that Munshi Saiyid Husain fully deserves the commendation he has received. The work done by Mr. P. V. Subbiah, Principal of the Agricultural School, was also spoken of most favorably by Mr. Miller, and the results of his teaching as detailed in a previous paragraph of this report in themselves confirm Mr. Miller's opinion of Mr. Subbiah. Babu Lachman Pershad, the permanent Personal Assistant, has been on special duty during the year in connection with the preparation of Pargana Books and Tahsíl Handbooks. The work done by him appears to me excellent.

I have the honour to be,

SIR,

Your most obedient servant,

D. C. BAILLIE,

*Director.*

# APPENDIX A.

*Statement showing the receipts and expenditure of the Department of Land Records and Agriculture, North-Western Provinces and Oudh, for the financial year* 1894-95.

| Heads of charges. | Budgetted allotment. | Actual expenditure. | Savings on budgetted expenditure. | Excess. | Receipts paid into treasury. | Budgetted receipts. | Remarks. |
|---|---|---|---|---|---|---|---|
| | Rs. | Rs. a. p. | Rs. a. p. | Rs. a. p. | Rs a. p. | Rs. a. p. | |
| Gazetted officers' travelling allowance ... ... ... | 3,650 | 3,643 8 0 | 6 8 0 | ... | ... | ... | |
| Office establishment ... ... ... ... ... | 24,984 | 23,920 12 9 | 1,063 3 3 | ... | ... | ... | |
| Ministerial officers' travelling allowance ... ... ... | 1,900 | 1,637 11 0 | 262 5 0 | ... | ... | ... | |
| Kanúngo Inspectors' establishment ... ... ... | 5,500 | 4,517 15 8 | 982 0 4 | ... | ... | ... | |
| Kanungo Inspectors' travelling allowance ... ... ... | 1,900 | 1,629 10 0 | 270 6 0 | ... | ... | ... | |
| Office contingencies ... ... ... ... ... | 6,436 | 6,843 2 5 | ... | 407 2 5 | ... | ... | |
| Traffic Registration charges ... ... ... ... | 22,000 | 20,594 9 6 | 1,405 6 6 | ... | ... | ... | |
| Experimental Farm establishment ... ... ... | 3,816 | 3,575 14 3 | 240 1 9 | ... | ... | ... | |
| Ditto contingencies ... ... ... | 9,424 | 9,423 10 7 | 0 5 5 | ... | 2,924 4 5 | 5,500 0 0 | |
| Ditto and Workshop contingencies ... ... | 2,570 | 2,570 0 0 | ... | ... | 2,775 12 0 | 2,500 0 0 | |
| Well experiments ... ... ... ... ... | 230 | 225 1 0 | 4 15 0 | ... | 10 4 6 | | |
| Reclamation of waste lands ... ... ... ... | 4,300 | 4,290 15 5 | 9 0 7 | ... | 3,919 2 9 | 4,500 0 0 | |
| Dairy experiment charges ... ... ... ... | 3,430 | 3,583 15 2 | ... | 153 15 2 | 17,472 4 7 | ... | |
| Agricultural shows ... ... ... ... ... | 600 | 599 0 3 | 0 15 9 | ... | ... | ... | |
| Breed ng bull and stallion charges ... ... ... | 2,500 | 1,353 12 3 | 1,146 3 9 | ... | ... | ... | |
| Imperial Institute, London ... ... ... ... | 500 | 99 14 3 | 400 1 9 | ... | ... | ... | |
| Miscellaneous experiments ... ... ... ... | 900 | 904 1 4 | ... | 4 1 4 | ... | ... | |
| Agricultural School ... ... ... ... ... | 4,000 | 4,000 0 0 | ... | ... | ... | ... | |
| Gházipur Stud Farm ... ... ... ... ... | ... | ... | ... | ... | 6,640 0 7 | 9,057 0 0 | |
| Miscellaneous receipts ... ... ... ... | ... | ... | ... | ... | 438 9 6 | 500 0 0 | |
| Total ... | 98,640 | 93,413 9 10 | 5,791 9 1 | 565 2 11 | 34,180 6 4 | 22,057 0 0 | |

NOTE.—Certified that the receipts in this office were checked in the manner prescribed in G. O. No. 34, dated 5th October 1883.

D. C. BAILLIE,
*Director of Land Records and Agriculture, N.-W. P. and Oudh.*

## APPENDIX B.

*Letter No.* 14, *dated* 27*th April* 1895, *from the Agricultural Chemist to the Government of India, to the Director of Land Records and Agriculture, North-Western Provinces and Oudh.*

In submitting to you the number of marks which I have awarded to the 18 students who were examined this week at Cawnpore in the papers on Agriculture, Chemistry and Agricultural Chemistry, I have the honour to make the following remarks.

2. In setting the questions I preferred to ask comparatively easy ones and to expect fairly complete answers, rather than to ask more difficult ones, and to expect only imperfect answers. Moreover this being the first final examination which has been held in the school, I thought it desirable to find out really what the students had *thoroughly* learnt. As will be seen from the enclosed statement, the papers have been on the whole very well done indeed.

3. As you are aware, I personally examined the students orally in Agriculture, Chemistry (including qualitative analysis), and Agricultural Chemistry. They were also examined in ploughing.

4. In all this series of tests they proved themselves to have gained a very thorough grounding in the several branches of Agriculture and in the Science of Chemistry. As I have said the standard on which I tested them was not a high one, but they proved that they had thoroughly come up to it. I have not here the list of marks awarded in the oral examination but I do not think a single student has failed altogether. One student showed himself not qualified to plough, but the others showed that they could not only plough but could also catch their cattle and yoke and harness them perfectly well, which was included in the ploughing test.

I was particularly pleased with the clear manner in which the majority answered the questions put in the examinations in Chemistry and Agricultural Chemistry. Also during the practical examination in Chemistry which consisted in the determination of the nature of a single salt, most of them did the work better and gave clearer reasons for their answers than I had expected, for this is a branch of the work which has been considered somewhat subordinate to the main portion. I may perhaps mention in regard to this work that some of the students placed too much reliance upon "flame" tests and were led into error through neglecting the "wet" tests. Their knowledge of rocks was *very* limited and they should I think have specimens of some of the principal rocks in their museum. Most of them had a very hazy notion of what a rock was and did not know a piece of quartz which I showed them. There were one or two other matters which I noticed, but they need not be mentioned here. They are of minor importance and I have mentioned them demi-officially to Mr. Subbiah, the head master.

5. The results of this examination reflect very considerable credit on the manner in which instruction has been imparted to the students. The standard is not a high one, but I am informed that most of the students could not speak English when they entered the school two years ago; and this has doubtless made the study of the subject of agriculture much more difficult for instructors and students alike. But the results of the examination are so satisfactory that I think the standard of next year's examination might be raised a little perhaps.

6. There is one point which I mentioned to you personally and to which I may be permitted to refer again, namely the employment of the students who have done well.

This is a question which others have raised but the problem still remains unsolved. The amount of money spent by Government on Agricultural education is not large and the several schools which are dedicated to this purpose are few in number and are working up to very different standards. But there is little doubt that the difficulty does not lie in either finding students, or in instilling a good grounding in Agriculture both theoretical and practical. The main difficulty lies in my opinion in keeping the "passed out" students to Agriculture instead of their going into other

lines of work, and thus having no object in keeping up the knowledge gained at the school. In Europe both the owners and managers of estates have come to recognize the value of an intimate acquaintance with the principles of agriculture, and the successful student at an Agricultural College has comparatively little difficulty in finding after employment in which the knowledge gained can be put to use.

In India this state of things does not at present exist. I believe that there are practically no openings on large estates, in which these students may find an opportunity to put their agricultural knowledge to a good purpose. Nevertheless I believe that this knowledge might be found just as useful here as in Europe. I do not think that they are capable of working independently and if they were left by themselves on an estate, they would probably be found of little use, but if placed as assistants under the care of a good agriculturist they would, I feel sure be found of use. Again some of them will, I understand, be drafted into the Revenue Department as Kanúngos. The duties of these officers are almost entirely clerical. But if such revenue officers have a knowledge of agriculture will it not frequently be of value to Government? During the various tours which I have made in different parts of India, I have met with very considerable ignorance, on the part of the subordinate officers of the Revenue Department, of agriculture generally, and in the course of the different enquiries which Government makes into matters agricultural, a knowledge on the part of these Revenue officials of the principles of agriculture should be of value. I may mention one subject of enquiry, which I believe to be of very great importance, namely a comparison of the different varieties of some of the crops in any province. This subject has never been thoroughly undertaken as yet, and I doubt if it could be undertaken with any hope of success unless we had at least one good agriculturist in each district.

Such an example takes us rather to a period when the number of agriculturists is considerably greater than it can be at present. In the meantime, however, if we could persuade those students who pass into the Revenue Department as Kanúngos to keep in touch with their agricultural knowledge, they might be found of use later on. Cannot something be done in this direction? Cannot some incentive be given to them to take up, outside their special duties as Kanúngos, the study of either crops or the insect pests of their neighbourhood? This information may be of little use for some time, but it would keep them in touch with their subject and this is to my mind an important point to keep in view.

*Statement of marks awarded in the examination of the students at the Cawnpore Agricultural School, April* 1895.

| Number. | Name. | Chemistry 50. | Agricultural Chemistry 50. | Agriculture 80. |
|---|---|---|---|---|
| 1 | Jagannath Prasad | 49 | 47 | 60 |
| 2 | Sukhanand Sharma | 50 | 40 | 71 |
| 3 | Ishwari Prasad | 47 | 45 | 56 |
| 4 | Fateh Bahadur | 45 | 45 | 57 |
| 5 | Ansuya Prasad | 42 | 45 | 49 |
| 6 | Umda Singh | 40 | 46 | 32 |
| 7 | Akmal Hosain | 37 | 47 | 40 |
| 8 | Shyam Sunder | 45 | 39 | 55 |
| 9 | Uma Shankar | 46 | 37 | 54 |
| 10 | Ganga Prasad Misra | 40 | 44 | 60 |
| 11 | Hamid Hosain | 41 | 42 | 66 |
| 12 | Debi Prasad Tewari | 36 | 46 | 69 |
| 13 | Shankar Lal | 34 | 41 | 54 |
| 14 | Gopal Rao Achwal | 36 | 37 | 32 |
| 15 | Raghubar Dyal | 34 | 36 | 46 |
| 16 | Ram Sunder | 35 | 30 | 49 |
| 17 | H. Huzabbir Hosain | 29 | 36 | 58 |
| 18 | Nageshwar Tewari | 29 | 35 | 49 |

(Sd.) J. WALTER LEATHER,
*Agricultural Chemist to the Govt. of India.*

# ORDERS OF GOVERNMENT.

No. $\frac{1168}{\text{I}-\frac{36B}{12}}$ OF 1896.

## RESOLUTION.

REVENUE DEPARTMENT.

*Dated Naini Tal, the 14th April* 1896.

READ—

The annual report by the Director on the operations of the Department of Land Records and Agriculture for the year ending 30th September 1895.

OBSERVATIONS.—*Village records.*—The resurvey and revision of records in the Meerut and Bahraich districts and in the Lalitpur sub-division of the Jhánsi district was commenced in the cold weather of 1894-95. The three parties which were employed on this work, under the supervision of the officers who have been deputed from the Imperial Survey Department, appear to have made substantial progress at a reasonable cost, the outturn of work being much greater than might have been expected from a consideration of the agency employed and the cost being only Rs. 29-1-8 per square mile. The acknowledgments of the Government are due to Mr. Scott, the Superintendent of Land Record Surveys, and to the officers working under him for their efficient management of these operations.

2. Advantage was taken of the existence of these survey parties to depute a large number of kánúngos and candidates for the appointment of kánúngo for instruction in surveying, as it was felt that the knowledge gained in the field must necessarily be of a much more practical nature than that formerly provided at the classes in Cawnpore, which have now been closed. In addition to this step, which is calculated to improve the efficiency of these officers, the promotion of kánúngos to executive posts, such as tahsíldárships and naib tahsíldárships, was continued with a view to attracting a better class of candidate for the lower appointments. During the year several kánúngos were promoted, permanently or temporarily, to naib tahsíldárships and two to tahsíldárships.

3. *Measures of protection.*—The Director's report on the 'analysis of districts'—a measure which has been undertaken in connection with the prevention of famine—will be included in the report of the Board of Revenue on the land revenue administration. The improvement of the pargana book, and the compilation of statistics which may be useful in the preparation of this analysis, have received much attention during the past year. The necessary arrangements have been made in the districts which are now, or have recently been, under settlement. The Board's report will doubtless also deal with the question of the treatment of precarious tracts—a matter noticed in paragraph 2 of the orders of Government on the last annual report of the Director. This subject is closely connected with the analysis of districts above referred to, and also depends for its proper disposal on the intelligent use of

the pargana book and connected statistics, to improve which efforts are now being made.

4. The experiments which have been carried on of recent years in connection with the reclamation of *úsar* land are also classed as measures of protection. The Agricultural Department has for some years been engaged in ascertaining whether it is possible to deal successfully with those areas of sterile waste which unfortunately are extensive in many districts of the Provinces. Three plots now remain under treatment. One of these, the Cherat reserve in the Aligarh district, has been leased, with the Government Dairy Farm, to Mr. Keventer, the dairy expert; but experiments in the cultivation of grass and trees and of certain cereals are still carried out. The result is that rice and grass are found to flourish on land on which water can stand, and that, while the sowing of trees has proved unsuccessful, trees *planted* in manured soil grow fairly well. At Juhi, in the Cawnpore district, during the past year more attention was paid than formerly to the planting of fuel-producing trees. The soil of the plot under treatment has improved so much that rice and even *rabí* crops can be raised, but fodder grasses have not been so successfully cultivated. The trees formerly planted, including *ním* and *shisham* and some tanning and fruit trees, such as *jámuns* and plantains, are doing well, and some mangoes and guavas have recently been planted. The more extended sowings of *babúl* and *dhák* tend to show that *babúl* thrives best on land which has been broken some time before sowing; while no definite results have been obtained from the sowings of *dhák*. At Gursikran rice and *rabí* crops and potatoes have been cultivated with a considerable measure of success, and fodder grasses continue to displace coarser varieties in and around depressions where water is retained. Hay appears to be unprofitable; but it is hoped that the making of ensilage may prove to be more successful. Tree-growing has given much the same results as at Juhi. Under the influence of continuous manuring and ploughing the reclaimed plot at Amramau, which, although sold to private persons and no longer under the control of the Department, was inspected during the year, appears to maintain its productiveness. The experiments which have been conducted hitherto therefore show that careful attention may turn barren plains into land capable of producing fuel, fodder, and even cereals, but it is doubtful whether the outlay can ever be recouped. The expenditure on the two plots now under the direct management of the Department has been over Rs. 15,000, while the income has amounted to about Rs. 6,000. It will be interesting to observe whether the outturn of fuel, grass fodder, and grain, with the standing stock of trees and the value of the grain-producing areas, will, in the next four or five years, increase to such an extent as to be an adequate return for the expenditure incurred.

5. *Agricultural experiments.*—Owing to unseasonable weather the investigations at the Cawnpore Experimental Farm were conducted under very unfavourable conditions. The inquiries made were connected principally with the value of various manures, and with the possibility of introducing new varieties of cane into the neighbourhood of Cawnpore.

The principal facts established appear to be that for wheat manures which contain a large proportion of nitrogen are the most valuable; that in order to secure the maximum outturn it is important to protect the common variety of cane from being laid by wind and rain; and that cane from other parts of the Provinces gave as good, if not a better, outturn than the local variety. Various experiments were made with other crops, but the account of them given in the report is too brief to allow of an opinion to be formed upon their value.

6. Among private experimental farms that at Meerut, which is managed by the Collector, appears to be conducted most satisfactorily. It is presumed from the wording of paragraph 21 of the Director's report that the proprietor himself requested the Collector to undertake the management, but the precise terms of the arrangement should be reported for the information of Government. It is noticed that the Collector has received considerable help from donations by Sheikh Wahid-ud-din, who has endeavoured in this way to evince his interest in agricultural experiments. The other private farms reported on appear to do useful work in an unostentatious manner. The Lieutenant-Governor notes with approval the Director's intention to enlist the sympathy and aid of the Court of Wards in this branch of the work of his Department. His Honor concurs in Mr. Baillie's opinion that estates under the Court of Wards may render useful service, for instance, in familiarizing the people with varieties of seeds which are superior to those locally produced, and in teaching them how to increase the fodder supply for their cattle.

7. *Agricultural improvements.*—During the year eleven agricultural shows were held. One great object of these fairs—the introduction of improved implements—can only apparently be obtained when a superior officer of the Department is present. The great falling off in the number of ploughs and chain pumps sold during the year is attributed to the inability of the Assistant Director to be present at more than two shows. There was, however, an increase in the demand for the seed of superior varieties of wheat and oats. The provincial and local agricultural associations which have been formed to encourage the discussion and introduction of agricultural improvements do not appear to have done much work during the year, but the circulation of the Urdu edition of the Agricultural journal, a departmental publication having the same objects as the associations, has increased, though not sufficiently to cover expenses. It is interesting to note that the well-sinkers employed by the Department find plenty of occupation, but it seems advisable, as remarked by the Director, to make their existence better known.

8. *Trade statistics.*—The statistics which have been collected show that there has been an increase of exports and a decrease in imports in the trade with Thibet, while the converse has been the case in the traffic with Nepal. The trade with these two countries together, however, shows an increase in the bulk and value of both imports and exports. The total value of the imports is stated to be about 58½ lakhs of rupees, while the exports were valued at about 42 lakhs. The

principal features of the traffic with Thibet were a decline in the imports of salt and wool and the exports of cotton goods and silver, and a slight increase in the exports of grain and sugar. The trade with Nepal, though less in volume than formerly, slightly recovered during 1894-95. Rice was less freely imported thence, but there was a large increase in the amount of imported timber. The principal exports to Nepal are cotton goods. The returns of the rail-borne traffic of the Provinces exhibit a decrease of 3½ per cent. in the weight of exports, but a rise of 8 per cent. in the value. The decrease in weight is due to a falling off in the exports of raw cotton, the coarser food grains, oil seeds, and sugar. The imports, on the other hand, increased by over 50 per cent. in weight and by 192 lakhs in value. The greatest increase was in the import of food grains, the total imports being the highest yet recorded and equal to the total under this head for the preceding five years. At the same time it may be noted that the net exports of wheat amounted to only six lakhs of maunds as against 20 lakhs in the preceding year. The explanation of these abnormal figures is, of course, to be found in the fact that in the northern portion of the United Provinces the crops had been severely damaged by excessive rainfall, so that the food stocks were largely depleted.

9. *Miscellaneous.*—Turning to the minor branches of the work of the Department, it may be noted that the demand for dairy produce at Aligarh shows no signs of diminishing. The Agricultural School appears to be working successfully, and the Lieutenant-Governor observes that the Director agrees with Dr. Leather, the Agricultural Chemist to the Government of India, as to the importance of ensuring that the knowledge gained by passed students of the school shall not be lost to the community.

10. Up to the present the interesting experiment of rearing silk worms in the plains from imported Assam cocoons seems to have been a failure; but it is to be hoped that the new supply of seed will give more encouraging results. Of the other matters touched on by the Director, horse and cattle breeding and the Lucknow Museum and the Government gardens are the subjects of separate reports, and the Government has no remarks to make at present concerning them.

11. The acknowledgments of the Government are due to Mr. Baillie for an interesting report, and to the officers mentioned by him as having contributed to the successful working of the Department during the last year.

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ORDER.—Ordered that a copy of the above Resolution be forwarded to the Director of Land Records and Agriculture, North-Western Provinces and Oudh, for information and guidance, and that copies, with copies of the report, be distributed as usual.

H. F. EVANS,

*Chief Secy. to Govt., N.-W. P. and Oudh.*

# REPORT

ON THE

# Operations of the Dept. of Land Records & Agriculture,

## NORTH-WESTERN PROVINCES AND OUDH,

*FOR THE YEAR ENDING 30TH SEPTEMBER 1896.*

*ALLAHABAD:*
North-Western Provinces and Oudh Government Press.
*1897.*

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# REPORT

ON THE

# Operations of the Dept. of Land Records and Agriculture,

## NORTH-WESTERN PROVINCES AND OUDH,

***FOR THE YEAR ENDING 30TH SEPTEMBER 1896.***

No. $\frac{622}{\text{VIII—201}}$ OF 1897.

FROM

W. H. MORELAND, ESQ.,

DIRECTOR OF LAND RECORDS AND AGRICULTURE,

N.-W. PROVINCES AND OUDH,

To

THE CHIEF SECRETARY TO GOVERNMENT,

N.-W. PROVINCES AND OUDH.

*Dated Lucknow, the 11th January* 1897.

SIR,

I HAVE the honor to submit the Annual Report on the work of this Department for the year ending the 30th September 1896.

2. Mr. Baillie took over charge of the Department from Mr. Hope on the 9th October 1895 and held it till the 12th of July 1896, when he was relieved by the Assistant Director, Saiyid Muhammad Hadi, who remained in charge of the Department in addition to his own duties for the rest of the year under report. Saiyid Muhammad Hadi held the post of Assistant Director throughout the year, with the exception of the period from 24th April to 5th July 1896, when he was on privilege leave; and Babu Lachman Pershad, Personal Assistant on special duty, acted for him in addition to his own duties.

3. Mr. Baillie proceeded to Gorakhpur on 23rd October 1895 to inspect the preparation of revised forms of pargana books and mauza registers. On his return he attended the informal meetings of the Agricultural Conference, which were held at Lucknow on 26th, 27th and 28th October. After a visit to Allahabad he joined his camp at Rae Bareli on 13th November; and while there he discussed with the Deputy Commissioner the question of the reallocation of patwáris' circles and pay, and saw what was being done towards the preparation of the pargana books and pargana hand-books. From Rae Bareli he marched through the Sultánpur and Fyzabad districts to Azamgarh, a district which had to be inspected on account of the approaching expiry of the term of settlement. From Sultánpur a short visit was made to Partábgarh to ascertain the progress made in the preparation of the pargana books and pargana hand-books. The inspection of the Azamgarh district lasted from 27th November to 8th December, after which Mr. Baillie toured through Gorakhpur and Basti districts to inspect the work of the special offices engaged in the preparation of the new pargana book and connected records. *En route* the work of the land record staff in both districts was inspected and the registrar and sadr kanúngos' offices at Bansgaon and Gorakhpur examined. In Basti the extensive irrigation works on the Birdpur estate belonging to the Messrs. Peppé were visited. In Gonda the work of the patwáris was examined with special reference to the necessity of a resurvey; and the Bulrámpur estate was visited and a scheme for cattle-breeding discussed with the Agent. Leaving his camp in Gonda, Mr. Baillie paid a visit to Allahabad on 12th January, and rejoined his camp on the 14th. From Gonda he marched through Bahraich, Sitapur, part of Kheri, Sháhjahánpur and Pilibhít to Bareilly, the inspection of which in connection with the report preliminary to settlement lasted up to 5th March 1896. The survey work in Bahraich, Sitapur, Kheri

and Sháhjahánpur and the general land record work in Pilibhít were examined *en route*. He returned to Lucknow on 5th March to attend the meetings of the Agricultural Conference held on the 10th, 11th and 12th March under the presidency of Sir Edward Buck. After that he paid a visit to Meerut to examine the work of the survey party there and to attend the Nauchandi fair. From Meerut he went to Babugarh to discuss with the Superintendent of the Civil Veterinary Department some questions connected with the work of that Department. The Usar Reserve and the Dairy Farm at Cherat in Aligarh were inspected towards the close of March ; then a visit was made to Allahabad to discuss with the Secretary to the Board of Revenue certain questions connected with the survey in Meerut. The examination of the students of the Agricultural School, Cawnpore, was conducted early in April ; and the last week of the month was spent in touring through Garhwál and the Naini Tal Bhábar, in order to obtain some insight into the working of the patwári staff in these districts.

4. In October 1895 the Assistant Director inspected the Reserves at Cherat and Gursikran in Aligarh, and submitted detailed reports on the work done in each in the preceding year. Towards the end of that month he attended the Agricultural Fair at Kakora (Budaun). In the beginning of November he visited the Lyall Farm at Ujhauli in Budaun, and submitted an inspection note containing some practical suggestions for improvement and a programme of experiments to be tried in future. In the beginning of December he visited the Benazir fair at Rámpur and the Reserve at Gursikran, and during the remainder of the month he was engaged in enquiring into certain agricultural methods and the subject of calico printing at Farukhabad and Lucknow. During the first fortnight of January he stayed at Cawnpore, holding trials of agricultural implements. In the middle of January he accompanied Dr. Leather to the Reserve at Juhi. Then after examining the students of the Agricultural School in kanúngo subjects he proceeded to make enquiries into the subject of silk-dyeing in Benares and of wool-dyeing in Mirzapur. In February he visited the fairs at Khairabad, Aligarh and Bulandshahr, enquired into the dyeing and calico printing industry at Jahangirabad (Bulandshahr) and met the Director of the Botanical Department, who came to inspect the Reserves in Aligarh and Cawnpore. In March he attended the Agricultural shows at Muzaffarnagar and Meerut, and inspected the Meerut Demonstration Farm. In the middle of April he went again to Gursikran Usar to supervise the harvesting of crops grown experimentally at the the request of Dr. Leather. In the last week of July he held the examination of candidates for kanúngoship at Aligarh and Cawnpore and in the beginning of August at Lucknow, and then he proceeded to Meerut to arrange for the purchase of a large supply of wheat required by the Director of Land Records, Burma, for experimental cultivation. During the remainder of the year he held the examination of kanúngos in Gorakhpur, Fyzabad and Benares.

## SECTION I.

### Maintenance of Village Records.

5. This section of the report appears in detail in the Revenue Administration Report. The following is a *resumé* of the more important matters arising during the year.

6. In addition to the districts of Meerut and Bahraich and the Lalitpur subdivision of Jhánsi, where revision of record of rights and survey operations were being carried on under Messrs. T. F. Freeman, W. Skilling and N. Bedford respectively, the districts of Sháhjahánpur and Kheri were taken up during the year under report and placed in charge of Mr. P. C. H. Smart and Mr. O. D. Smart. The survey of portions of the northern tracts of the Bijnor district and the survey and record writing of the Gursarai and Kakarbai estates in Jhánsi and of the Sitapur alluvial mahals were also undertaken under the orders of the Board of Revenue. In Bijnor the record writing is being done by the Settlement Department and the cost of the survey also is a settlement charge. Excluding the work done in this district, the total

area surveyed in 1895-96 amounts to 3,100 square miles, out of which the records of 2,866 square miles have already been written up. The record writing of the 2,439 square miles surveyed last year had also to be done this year owing to the delay in starting operations in 1894-95. The total expenditure from the commencement of operations in 1894-95 to the close of September 1896, including charges for supervision and instruments, has been Rs. 2,72,184-12-6. Deducting from this Rs. 31,545-15-4, the proportionate cost of instruments debitable to future years, and Rs. 4,140, the survey charges of 207 square miles of which the records could not be written up this year, the actual cost of survey and record writing for the total area of 5,305 square miles comes to Rs. 2,36,498-13-2. To this must be added the amount of Mr. Freeman's salary (Rs. 13,263-8-1) which is a provincial charge: the total cost then amounts to Rs. 2,49,762-5-3, which gives an incidence of Rs. 47-1-3 per square mile. This exceeds the cost reported last year by Rs. 17-15-7; last year however the figures, as remarked in the report, did not show the whole expenditure to be incurred on the area on which the average expenditure was calculated. In addition to supervising the survey operations referred to above, Mr. Scott got through a great deal of miscellaneous work : he personally instructed the classes of junior Civilians in Sháhjahánpur; tested the village plans in the districts of Gonda, Farukhabad, Aligarh and the hill parganas of Naini Tal; and visited Bara Banki and Sítapur to consult the District Officers as to the best method of carrying out corrections of village maps by patwáris. Mr. Scott and his subordinates have had many difficulties to face and the success of their efforts deserves the fullest recognition. Among the hindrances may be noticed the simultaneous commencement of the cadastral and traverse surveys in Meerut, Bahraich, Sháhjahánpur and Kheri; the necessity of training the patwáris of each pargana at the commencement of the field season; the want of boundary marks in partitioned villages; the frequent calls on patwáris to do other work; their absence without leave in spite of fines and other punishments; and the irregular attendance of zamíndárs and cultivators at the time of khasra writing. Most of these hindrances may be expected to disappear now that the system is in working order : but in the present year the necessary deputation of patwáris on famine work is greatly delaying the survey, and will doubtless add to the average cost.

7. The reorganization of patwáris' circles and salaries is still in progress in the Muttra, Agra and Etah districts. In Muttra a further extension of two years has been allowed for the complete introduction of the final scale. Owing to the prevailing scarcity the introduction of the revised scale suggested for the Agra district has also been postponed for a year, while proposals to allow a further extension of two years in Etah are being submitted to the Board of Revenue. A rearrangement of patwáris' and kanúngos' circles in Garhwál, involving an increase of Rs. 2,868 per annum in pay, was sanctioned during the year, and proposals for a further increase of Rs. 1,644 have been submitted to the Board of Revenue. The proposal to raise the pay of the patwári staff of the Gonda district has received the general approval of the Board of Revenue and the question of improving the position of the patwáris of Kheri and Sítapur districts is under the consideration of the local authorities. It has been decided to introduce the system of personal pay for patwáris in Oudh, and general rules for the revision in that province are being prepared. Pending their sanction, the revisional schemes for certain districts noticed in previous reports have been kept in abeyance.

8. The special kanúngo class attached to the Agricultural School at Cawnpore having been discontinued, candidates for kanúngoships are admitted to the school and receive instructions in the special duties of a kanúngo in addition to the prescribed course in agriculture. During the year under report fourteen candidates of this class were admitted into the school. Mr. Scott, who has examined the candidates in surveying, reports that they have been very carefully instructed in the present method of surveying villages and are capable of making village plans unaided. Besides these, one hundred and eighty-six candidates for kanúngoships from various districts were attached to survey parties for instruction, and obtained certificates of proficiency in surveying from

the officers in charge. The annual divisional examination of kanúngos was held as usual during the rainy season for all divisions except Bareilly, where it will be held this month. Out of 117 persons who appeared for examination 35 passed in all subjects and 80 in part. Of the number of successful candidates 19 have not yet received practical training in surveying and will be required to join a survey party. During the past year 23 kanúngos received promotion to naib tahsíldárships, but only one was permanently appointed to that post; two kanúngos officiated as tahsíldárs and one was provided with a miscellaneous appointment. As in last year, five kanúngos were selected by the Board of Revenue for naib tahsíldárships. The question of the promotion of kanúngo inspectors has been referred to the Board of Revenue.

9. Mention has been made in a previous paragraph of the districts in which the ordinary work of patwáris and kanúngos was inspected by the Director during his cold weather tour, and of those which were examined by him with a view to prepare the usual report preparatory to the revision of settlement. The kanúngo inspectors attached to the Department were as usual employed in inspecting the patwáris' papers and kanúngos' registers in 25 districts with a view to correcting errors of procedure and bringing defects to the notice of the district authorities.

10. The following important changes were made in rules and procedure. Revised rules for the destruction of patwáris' records, and registers and returns maintained and prepared by the kanúngo staff have recently received the sanction of the Government of India. Forms of stock books to be kept by the sadr kanúngo, the registrar kanúngo, the supervisor kanúngo, and the patwári school teachers have received the approval of the Board of Revenue. A form of mutation register for the Garhwál district following the form of the khewat has met with the Board's approval. The preparation of a field book by patwáris in this district having been found to be impracticable, the proposal to maintain a simple list of fields or index to the map is under the consideration of the Board. Rules for the guidance of patwáris in the Kumaun and the Garhwál Bhábar have been drawn up and will shortly be submitted to the Board of Revenue.

11. The systematic testing of patwáris' papers and the use of pargana books by superior officers has been the subject of correspondence with the Board of Revenue during the year under report. Pargana officers and tahsíldárs were formerly directed to inspect between them each year patwáris' work in one-third of the circles in a tahsíl, but subsequently the duty of inspecting every village in a tahsíl once in three years was imposed on tahsíldárs. These requirements were inconsistent, and experience showed that it was impossible for tahsíldárs to carry out their task effectively; the rules have therefore been amended and tahsíldárs are required to test in every patwári's circle during three years, and in each circle to test the papers of as many villages as is practicable. At the same time testing done by naib tahsíldárs (who are now in charge of land records work) has been permitted to count as testing by superior officers.

12. Lists of boundary and survey marks have been prepared in all the districts of the united provinces except in some tahsíls of districts which are under settlement. Much progress has been made in the inspection of the marks and their repair and re-erection wherever necessary. A scheme is now being prepared for the erection of stone boundary pillars in place of ruined masonry platforms, and a trial is being given to a suggestion made by the Deputy Surveyor-General that a trench should be dug round the mark and the excavated earth be piled over it, the earth mound thus raised being yearly repaired until it has become grass-grown.

## SECTION II.

### Analysis of Districts.

13. This section deals only with the steps taken to improve the material which forms the basis of the annual analysis of districts, the detailed report forming a section

of the Board's Administration Report. A portion of the staff employed for compiling the revised mauza registers and pargana books in Saháranpur was moved to Gorakhpur in June 1895, and the remaining portion, with Babu Lachman Parshad, the permanent Personal Assistant on special duty, went over in October after completing the pargana books for Jhánsi. The settlements of Gorakhpur and Basti were concluded many years ago and the annual figures of cultivation and holdings for their villages were compiled by the registrar kánúngos in rough forms to be copied in the regular registers when supplied by the special staff. To minimise the labour of copying it was decided to push the compilation of new mauza registers as fast as possible; the work was started in the two districts simultaneously and in addition to the salaried staff a number of men were employed on piece work. During the year under report mauza registers for all the villages of the two districts were compiled, and bound volumes were supplied to tahsíls Bansgaon, Deoria, Hata and Padrauna of Gorakhpur, while books for the remaining two tahsíls of Gorakhpur and for the tahsíls of Basti were in course of transit. Pargana books for tahsíls Bansgaon and Deoria were also supplied for use during the present cold weather. Babu Lachman Parshad remained in charge of this work till the 24th August 1896, when he was appointed to officiate as a Deputy Collector. The total expenditure on this head including his pay amounted to Rs. 11,608. New tahsíl hand-books, pargana books and village registers have been prepared under the supervision of Settlement Officers in the districts of Lucknow, Unao, Rae Bareli and Partábgarh; while in Hardoi, Sitapur, Fyzabad, Bara Banki, Sultánpur and Badaun the work is in progress. The revised form of pargana book has been found most valuable in localizing the deteriorated parts of a district and in showing the direction in which inquiries are needed, as is shown by the reports received from the District Officers of Bulandshahr and Muzaffarnagar. The old pargana books also were widely utilized in several districts, but in some cases their value seems to have been overlooked. Proposals have been submitted for certain modifications in the rules in order to secure that the information available in these most valuable records should not merely be accumulated, but should be made practically useful in district administration.

## SECTION III.

### System of collection of Revenue and Rental in Precarious Tracts.

14. In these provinces this subject is dealt with by the Board of Revenue. A note on agricultural depression during recent years was prepared by the Director on the lines indicated in G. O. No. $\frac{1024}{\text{I}-286\text{B}}$, dated 23rd April 1895, and embodied in the Revenue Administration Report for 1894-95. A similar note will be prepared for 1895-96.

## SECTION IV.

### Measures of Protection including Arboriculture.

15. **Reclamation of usar lands.**—Of the three usar reserves under the control of this Department one is situated at Juhi in the district of Cawnpore and the other two at Gursikran and Cherat in Aligarh. The most prominent experiments carried on under the Assistant Director's management at the Juhi and Gursikran reserves have for their object (*a*) the determination of the effects of enclosure on grass vegetation and suppression of salts in the usar soils, (*b*) the reclamation of waste lands by sowing and planting trees and by deep tillage and manuring. All three reserves were inspected during the year under report by Mr. J. F. Duthie, the Director of the Botanical Department, Northern India. An account of the operations carried on at each reserve during the year is given in the following paragraphs:—

16. **Juhi usar.**—The experiments carried on in the Usar Reserve at Juhi are directed chiefly to determining the results of sowing and planting trees yielding fuel and cultivating crops for fodder. A small portion of it has also been broken up for cultivation of cereals. A crop of mixed peas and barley gave an outturn of 14 maunds per acre during the year under report, showing that the condition of the soil has improved considerably. The cultivated area can if required be let to tenants at Rs. 5 to

Rs. 6 per acre, but as stated in previous years the object of the Department is to plant the reserve up, and no attempts are therefore made to break land to any great extent for the cultivation of food grains. Almost all experiments suffered more or less from the deficiency of rainfall during the year under report, but the drought proved particularly injurious to the sown and planted dhák (*Butea frondosa*) trees and in a smaller degree to the babul (*Acacia arabica*) plantations. The dhák trees planted and sown in *thálas* in previous years and in the year under report have been kept in fairly good condition by means of frequent well-irrigation and constant hoeing, but the plants raised from seed on flat ground last year died out in considerable numbers. The dhák seed sown broadcast this year in an area of 1½ acres germinated remarkably well, but the seedlings dried up in consequence of failure of rain towards the end of the rainy season. The above remarks regarding trees grown in *thálas* apply equally to the babul trees planted or sown in *thálas* during the past two years, but during the year under report nearly four-fifths of the babuls raised in *thálas* from seed or otherwise dried up completely. The plot sown with babul seed two and a half years ago is now well covered with young trees up to four feet high. Among the plots sown with babul seed last year the most numerous as well as the most healthy plants exist now in the plot on which rain water stood for a sufficiently long time to thoroughly soften the seed and favour close germination. The trees in plots prepared with an improved (the Watt's) plough succeeded better than those in plots ploughed with the native plough, in which the germination was particularly poor. Broadcast sowing proved more successful than sowing the seed in furrows opened by country ploughs. During the year under report 2½ acres in all were sown with babul seed by different methods, one of which consisted in sowing the seed on ridges two feet wide, one foot high and ten feet apart. Except where the soil was greatly impregnated with kankar the germination has been very good and the plants are looking healthy. *Inga dulcis* seeds sown on manured land germinated very well, but nearly half of the seedlings died owing to want of rain. The seed of *Cassia auriculata* was tried, but failed to germinate. The attempt to propagate the Farásh tree (*Tamarix auriculata*) both from seed and from cuttings resulted again in a failure. Jait (*Sesbania ægyptiaca*) seed sown last year germinated, but the plants did not survive. The tanning trees, *Terminalia chebula*, *Terminalia belleriea*, *Phyllanthus emblica* and *Zizyphus Xylopyra*, planted in 1893, are making very good progress. A very large number of fruit tress, chiefly guava, were planted this year. These appear to be particularly liable to the attack of white ants, which eat into the root, but most of them are in good condition. A considerable number of the 700 nim (*Melia Indica*) and shísham (*Dalbergia sissu*) trees planted in thálas withered during last year. Only 265 of them have survived, and these too with the aid of frequent watering and hoeing; 435 plants were put in in place of the dead ones, of which 272 are now alive.

The old date-palm trees are now doing well, but their progress is remarkably slow. The *sarpat* grass planted as a hedge last year and during the year under report did not grow satisfactorily owing to want of rain. The Director of the Botanical Department of Northern India, in his inspection report on usars, suggested the advisability of sowing certain trees and bushes of the papilionaceous order on usar lands. Accordingly eighteen different kinds of seed, kindly supplied by him, were sown in February in separate *thálas* previously filled with good earth, but none of these germinated. The *thálas* were sown again with the same seeds after the rains, and fifteen out of the eighteen kinds germinated well. Sorghum, grown in the hot weather by means of artificial irrigation for fodder, gave an outturn of 96 maunds of green fodder in the first cutting, of 108 maunds in the second and of 40 maunds in the third cutting. Lucknow melons grown in hard usár soil, which had been mixed with sand in order to improve its texture, yielded an outturn of 100 maunds per acre, and the melons were generally of superior quality. Rice sown on a quarter of an acre germinated well, but subsequently the crop failed on account of want of rain. Maize tried experimentally for the first time gave a produce of 16 maunds per acre of grain and 80 maunds per acre of dry stalks. The growth of grass was very poor during the year and it dried up at an

unusually early date. It was cut towards the close of the year for feeding cattle and making silage. The total receipts up to the end of the year amounted to Rs. 599-0-1 and the total expenditure to Rs. 5,801-3-4.

17. **Gursikran Reserve.**—Nearly two acres of land were broken up for cultivation during the year under report. The cultivated area let out to tenants now extends over 131 bighas paying a total rental of Rs. 396-10-0, and 29 bighas 10 biswas are cultivated under direct management. Muzaffarnagar wheat grown without manure on eight acres of land broken up last year, which was not absolute usar, yielded the high outturn of 16 maunds per acre, but indigo, which succeeded wheat on the same land, gave only 68·5 maunds per acre of green stalks. On other plots the outturn of mixed wheat and barley amounted, on an average, to 5·5 maunds per acre. Soft wheat imported from Muzaffarnagar was advanced to the tenants with a view to find out whether the variety was less liable to the attacks of *sehun*, a fungus which does considerable damage to the indigenous varieties ordinarily cultivated by the tenants at the reserve; but the imported seed proved to be equally susceptible to the disease unless "pickled" with coal tar, which has been found to be a good preventive remedy. Paunda sugarcane grown for the first time at the reserve did well. The rice crop, however, was a complete failure owing to scanty rainfall. Six kinds of quick-growing fodder crops were sown towards the close of April 1896 with a view to ascertain whether they can be successfully grown in the hot weather with the aid of canal irrigation, and to determine the outturn of green fodder in each case. The crops were cut for the first time on the 1st of July and again on the 8th of October 1896. The following quantities per acre were yielded by the various crops:—

| | |
|---|---|
| (1) *Sórghum Impi* ... ... ... ... ... | 11,193lbs. |
| (2) Guár (*Cyamopsis Psoralioides*) ... ... ... | 9,615lbs. |
| (3) Juár (*Sorghum Vulgare*) and guár mixed ... ... ... | 7,503lbs. |
| (4) Maize (*Zea Mays*) ... ... ... ... ... | 7,400lbs. |
| (5) Juár alone ... ... ... ... ... | 6,560lbs. |
| (6) Chena (*Panicum Miliaceum*) ... ... ... ... | *Nil.* |

The last named crop did not germinate, though the seed was sown three times. The experiment has shown that if irrigation be available the first five crops can be grown in the hottest part of the year even on soils of poor quality. Owing to deficiency of rainfall the grass generally did not grow so luxuriantly as in former years: the yield of hay from the poorest plots amounted to 8·5 maunds per acre, but on the better plots the average was a little over 12 maunds. A considerable demand for the usar hay has sprung up lately owing to the scarcity of fodder, and about 900 maunds of hay were sold in all for Rs. 210. The cultivators are gradually becoming alive to the value of usar hay as a fodder. An area of 70 acres of grass land was, as an experiment, given under certain restrictions for grazing purposes to Mr. Keventer, who kept his stock of dairy cattle on that area for seven months. The effect of grazing on the present improved condition of the soil and on the grass vegetation will be watched carefully and reported on in due course. The prevailing grass on the usar is *Sporabolus pallidus*, but superior grasses, *e.g.*, *dúb* (*Cynodon dactylon*) and *bat* (*Diplachne fusca*) are gradually finding a permanent footing. The silage made from usar grass is generally of poor quality; experiments have been started lately to improve its quality by mixing the grass in certain proportions with better fodders prior to putting it in silos, and the results will be noticed next year. In the area of 5 acres of usar land sown broadcast with babul seed last year the young plants have been making fair progress, but have recently sustained some damage from frost. The babul seed sown in the beginning of the past rainy season on flat ground and on ridges germinated well, but most of the seedlings dried up in August owing to drought. The dhák trees sown and planted during the past two years are in good condition, but the sowings made in the year under report were not successful. The *jhau* trees (*Tamarix gallica*) planted along the side of the canal distributary are flourishing, but Farásh (*Tamarix auriculata*) again refused to grow. Jait (*Sesbania Ægyptiaca*) and guava trees sown and planted

during the year are making satisfactory progress. The seeds of plants of the order *papilionacea*, supplied by the Director of the Botanical Department, and sown in the rains germinated fairly well, but the seedlings all died out. The babul, shísham, dhák and ním trees raised in thálas, which had particularly careful attention paid to them, remained in a flourishing condition throughout the year; the date-palms are perfectly healthy, but their progress is remarkably slow. On the recommendation of the Agricultural Chemist to the Government of India, experiments were started in the beginning of July 1895 to determine the weight of dung obtained from a pair of bullocks fed on grass and straw only, and from a pair to which 5lb. of oil-cake per diem were given in addition. The dung and the litter in each case were removed daily and conserved separately in pits. The contents of the pits were weighed at the end of twelve months and the following results obtained:—

| | Mds. srs. ch. | Mds. srs. ch. |
|---|---|---|
| Total weight of fresh dung ... ... ... | 148 31 1 | 148 8 0 |
| Do. of the dung at the end of the year ... ... | 45 35 0 | 51 0 0 |
| Weight of fresh litter applied ... ... ... | 48 29 0 | 50 9 0 |
| Do. litter at the end of the year, *i.e.*, when converted into manure ... ... ... ... | 30 10 0 | 31 20 0 |

These results show that in the second case the percentage of solid matter in the dung was somewhat higher than where no cake was allowed. With a view to determine the quantity of firewood used per family of cultivators, firewood was given to two cultivators in quantities just enough to satisfy their daily requirements. Of the two families one consisted of the cultivator, his wife, one son thirteen years old, second son seven years old, one daughter five years old, and third son two years old; and the other of three members, *viz.*, the cultivator, his wife and one daughter three years old. The former family consumed 73 maunds eight seers and the latter 44 maunds 28 seers of fire-wood in the course of a year. The total receipts of the Reserve up to the end of the year amounted to Rs. 6,488-12-8 and the total expenditure to Rs. 12,897-5-11.

18. **Cherat.**—The Reserve at Cherat with the Government Dairy attached to it was, with the approval of Government, leased out for five years beginning from 1st November 1894 to Mr. Keventer, who has been managing the farm and the dairy since then on his own responsibility. No experiments are now directly carried on by the Department in the direction of reclamation. Mr. Keventer's chief interest in the Reserve lies in the dairy, which he has been working with remarkable success; he has not, however, lost sight of the value of reclamation experiments, and has been improving the condition of the various plots of lands which best suit his purpose by heavily manuring them with the dung obtained from the dairy cattle. He has grown rice in the kharíf and barley and oats in the rabí, and the outturn has been very fair. The whole of the grass has been utilised by him for feeding cattle, and on account of the poor growth due to scarcity of rain the yield of grass from the usar proved insufficient for the requirements of the dairy stock, and he was permitted to use some of the Gursikran reserve for grazing.

The babul trees and the different varieties of ficus plants grown in *thálas* heavily manured with dung have been making fair progress. The old date-palms are in particularly good condition and have thriven better at this reserve than elsewhere. The sowing of babul and dhâk seed has, however, not yet given favourable results.

The success achieved by Mr. Keventer in the dairy business has induced him to come forward with an application either to take a long lease of the usar and the dairy or to purchase them outright, and since the close of the year Government sanction has been given to the sale on certain terms. It is not yet known whether these terms will be accepted.

The Reserve was visited by Mr. Baillie as well as by the Assistant Director during the year.

19. The usar plot at Amramau, which was sold in 1892 after being brought under cultivation by the Department, has remained under observation. Owing to family

disputes among the owners little has been done in the way of further improvement, but the soil shows no signs of deterioration.

20. **Arboriculture.**—The actual length of roads under avenues on the 1st of April 1895 according to the latest figures furnished by the District Boards was 8,435 miles, to which 161 miles of new avenues were added during the year. The addition was mostly confined to second class roads, bringing the percentage of avenues on them from 40 in the preceding year to 41 in the year under report. With the exception of twelve districts where arboricultural operations were wholly or partially under the control of the Public Works Department, the District Boards continued to retain the management of arboriculture in their own hands. The management of these operations by the Public Works Department was for the most part either costly or otherwise unsatisfactory. The total expenditure on district arboriculture amounted to Rs. 67,611 and the receipts to Rs. 59,234 as compared with Rs. 71,963 and Rs. 51,365, respectively, in the preceding year. Orders have been issued to secure greater continuity in the administration of this department by the adoption of working plans for a series of years in advance.

## SECTION V.

### Agriculture, including Experimental Farms.

21. **Cawnpore Experimental Farm.**—The operations carried on at the Experimental Farm, Cawnpore, in the year 1895-96, have been described in full detail in a separate report already published by the Department and they are therefore only briefly noticed here. The year was one of scanty rainfall and therefore unfavourable from an agriculturist's point of view. At the Experimental Farm, which enjoys the facilities of canal irrigation, the deficiency of rain was not in general keenly felt, but the sugarcane crop, which occupies a very prominent place in the programme of the farm experiments, suffered to some extent from the want of sufficient rain and gave on the whole a lower outturn than it would have given in a year of normal rainfall. For cotton, on the other hand, the absence of rain in October and November and for wheat the absence of rust-causing cloudy weather in February proved beneficial.

In the permanent manurial experiment with maize the best outturns, *viz.*, 2,668lb. and 2,027lb. of grain per acre were yielded by the plots manured respectively with sheepdung and poudrette; and among all the manures applied saltpetre gave the lowest yield. In the permanent manure experiment with wheat the best outturns varying from 3,104lb. to 3,206lb. were produced by the plots treated with sheepdung alone or in conjunction with bone-dust and gypsum. Poudrette gave the next high outturn of 3,091lb. Here also the lowest outturn was given by saltpetre. In the manurial experiments with country and hill potatoes the best results were obtained from poudrette and castor-cake. In the experiments to determine the comparative effect of certain manures on indigo the highest outturns of green stalks were gained from cowdung and bone-dust. Gypsum applied to gram gave an outturn of 1,512lbs. of grain per acre as against 1,519lb. obtained from farmyard manure. The manurial experiment with sugarcane started in 1894-95 in accordance with instructions from the Agricultural Chemist to the Government of India has shown that the quantities of manures hitherto used are insufficient to produce any appreciable effect on the yield, and the plan of this experiment has therefore been changed. In the permanent experiment to determine the manurial effect on wheat of certain vegetable manures old indigo refuse and fresh indigo refuse gave, as usual, the best results, yielding 2,729lb. and 2,254lb. per acre respectively. In the experiment to determine the results of maize sown before rains and after rains, the latter, contrary to general experience, gave better results. A similar experiment made with seven varieties of cotton showed that in the case of five varieties early sowing gave higher outturns than late sowing. The experiment to determine the comparative vitality and productive power of fresh and old indigo seed confirmed the results obtained in previous years, *viz.*, that the largest outturn of green stalks was obtained from seed not more than sixteen months old, and that the older seed, though it produced poorer crops, was not absolutely unfit for sowing. In

the experiment to ascertain the relative merits of different methods of cultivating lucerne the largest yield of green fodder was obtained, as in the two preceding years, by sowing the seed on ridges. In the experiment to determine the effects of deep and shallow ploughing with improved and country ploughs, the plot ploughed with the latter gave a higher outturn of wheat contrary to the past experience which was in favour of the improved plough; but the advantages of the improved plough do not lie so much in increased outturn which may or may not follow, as in the greater economy, speed and efficiency with which the seed-bed is got ready for sowing. The outturn obtained during the year under report in the experiment with American varieties of cotton was extraordinarily good, varying from 237lbs. to 326lbs. of fibre per acre in the first picking, and an interesting fact discovered during the year was that the several varieties under trial were capable of yielding successive outturns of fibre and seed if the plants were, instead of being cut down on completion of the first picking, allowed to stand in the field. In the second crop the produce of fibre ranged between 113lb. and 223lb. Experiments will be continued with a view to determining the economy of this method of cultivating cotton. Canadian oats proved as in former years to be capable of giving very luxuriant crops of green fodder, but poor outturns of grain. Experiments made with juár (*Sorghum vulgare*) and guár (*Cyamopsis psaraloides*) during the year under report showed that abundant green fodder could be easily produced for cattle even in the hottest part of the year with the aid of artificial irrigation, and that they were both excellent crops for fodder purposes. Three cuttings were obtained from juár in the course of 117 days, yielding in all as much as 42,669lbs. of green fodder per acre. Guár gave an outturn of 15,385lbs. of green fodder per acre in one cutting, the period of growth being 59 days.

The Agricultural Chemist to the Government of India made a short stay at the farm during the cane-crushing season to analyse the juice and supervise the manufacture of gur. He has discussed the results of sugarcane experiments fully in an interesting note which forms an appendix to the Farm Report and has also been published *in extenso* in No. 19 of the Imperial Agricultural Ledger Series of 1896.

22. **Private Farms**: (*a*) *The Meerut Demonstration Farm.*—This farm is conducted under the immediate supervision of the Collector of Meerut by an experienced apprentice of the Cawnpore Farm, towards whose salary the Department has contributed Rs. 25 per month. The value of the experiments at the farm is greatly enhanced by the personal interest taken in its working by Mr. Wyer, the Collector. Most of the experiments tried at this farm are based on the same lines as those carried on at the Government Experimental Farm, Cawnpore, and it is unnecessary here to enter into details. In one point the work of the farm has given speedy and satisfactory results; experiments showed the manurial value of the silt from a sewage drain adjoining the farm, and this manure is now widely used in the vicinity. Seed of various crops—Muzaffarnagar wheat, Kabul gram, Cape oats, barley and Jaunpur maize—produced at the farm was distributed to cultivators in Meerut and elsewhere. The farm also kept two bulls, an Arab horse, a donkey stallion, two he-goats and one buffalo bull for breeding purposes. The services of all except the donkey stallion are appreciated, and this department of the farm is of special value. The report of the farm received from the Collector was sent to Dr. Leather, Agricultural Chemist to the Government of India, who made certain practical suggestions, to which the Collector's attention has been drawn.

(*b*) *Jatau Farm.*—The farm belongs to Kuar Karan Singh, a landholder in the Agra district. It extends over an area of 112 *bighas* and is worked with the improved agricultural implements in common use at the Government Farm, Cawnpore. In an experiment to try the effect of various manures on wheat, lime, decayed leaves and horse-dung are reported to have given very satisfactory results. The wheat commonly grown at the farm is of the Muzaffarnagar variety, which is also distributed by the owner to his tenants in the neighbourhood of the farm. Five varieties of juár were sown at the farm for fodder, of which two, *viz.*, the

*bansmati* and the *jogia* gave good outturns. The *bansmati* grows to a height of thirteen feet and yields excellent fodder. Much benefit must result from a farm of this description and the owner is to be commended for his public spirit.

(*c*) *The Lyall Farm at Ujhauli* is maintained by the owner, Chaudhri Saiyid-ud-din Husain of Budaun, whose interest in horse-breeding and cultivation of imported seeds is noteworthy. A programme of certain practical experiments to be tried at this farm was drawn up by the Assistant Director, who visited it in the beginning of the year; but in spite of several reminders the Chaudhri has not yet sent a report of the work done during the year.

(*d*) *Khairandesh Nagar Farm.*—Babu Sita Ram, the owner of this farm, has lately entered public service as Manager of the Court of Wards' Estate, Sultánpur, and his experiments have apparently been abandoned. No report has been received from him on the work done during the year.

23. **Court of Wards' Estates.**—In the last Annual Report it was proposed to bring to the notice of the Board of Revenue the advantage of instituting demonstration farms in the wealthier Court of Wards' Estates. It was remarked that much useful work could be done by the Court of Wards in demonstrating the advantage of using selected seed and in improving the fodder supply. The proposal met with the approval of Government, and the matter was referred to the Board of Revenue, who issued instructions to District Officers to inform this Department of the action taken. From the report of District Officers received during the year it appears that in six districts there are no estates under the Court of Wards, and that in twenty-three districts no action was taken in connection with the improvement of agriculture. In several of these districts the estates under management are either so small or so embarrassed that nothing can be expected from them. In the remaining nineteen districts of the province agriculture received more or less attention. The Majhauli Estate in the Gorakhpur district has lately established an experimental farm measuring 32 bíghas, and the Bulrámpur Estate in the Gonda district has set apart 330 acres for experiments in grass and cereals. Some seed was sent to the Majhauli Farm from this Department in November last and advice given as to the manures that should be applied to the farm land. In the Court of Wards' estates of Meerut and Sultánpur there are three fuel and fodder reserves, two in the former district and one in the latter. These reserves are reported to be in a flourishing condition. Experiments of some interest with *babul* and *dhák* plantation were carried on during the year in the Bareilly, Budaun, Etáwah, Allahabad and Bara Banki districts, but owing to drought the results were far from satisfactory. A quantity of the Jaunpur variety of maize was either distributed or tried in the Court of Wards' estates in Etáwah, Bareilly, Budaun, Jhánsi, Sítapur and Bara Banki, but the circumstances of the year were unfavourable to this as to other kharíf crops; the most interesting experiments with maize were conducted in Sitapur. Bájrá seed from Gujrát and from Darbhanga was also tried in Etáwah, Bijnor and Gorakhpur. No estates in any districts of the province, other than those of Aligarh, Gházipur and Gorakhpur, appear to have paid attention to the improvement of agricultural implements, and very few estates have spent anything on increased facilities of irrigation. In Bulrámpur a large number of masonry wells was constructed and proposals were made for utilizing the water of the hill-streams in the estate. As regards stock breeding there were seven bulls and nine horse and five donkey stallions maintained during the year by Court of Wards' estates in thirteen districts, and the Bulrámpur Estate has arranged for the supply of 30 Khairigarh bulls for breeding purposes. Of all methods of improving agriculture that are within the power of estates of ordinary size the supply of bulls of a suitable breed is probably the most advantageous.

24. **Government Gardens** (*a*) *Saháranpur Garden.*—The season was not a favourable one: nearly the whole of the 58 inches of rain measured at Saháranpur fell on 39 days only during the three months of the rainy season, and this downpour was followed by a drought which lasted for eight months. No lasting damage was

lone, but the appearance of the less acclimatized trees suffered. The important mango crop suffered from the dryness of the atmosphere and the crop of limes and lemons was also light. In other respects the year's working was satisfactory. Some improvements were effected in the appearance of the garden, and experiments of some value in the cultivation of fodder and fibre plants and in the acclimatization of a considerable number of imported plants were carried out. More than 95,000 plants (52,000 being strawberries) and 34,735 packets of seeds were distributed, and 879 lbs. of drugs were supplied to the Government Medical Depôt from the garden. The total direct and indirect receipts of the garden amounted to Rs. 26,458-7-11 exceeding the expenditure by Rs. 1,125-4-0.

(*b*) *Lucknow Garden.*—In Lucknow, as in Saháranpur, the year was unfavourable for horticulture and particularly for ornamental gardening and fruit growing. In the distribution of fruit trees a considerable advance was however made during the year. Experiments on fodder crops, so far as they gave definite results, were failures. The working of the scheme for training gardeners, native and Eurasians, has been for some years past not entirely satisfactory, and proposals for its amendment have been submitted for the orders of Government. The total expenditure on the garden amounted to Rs. 15,858 and the total cash receipts to Rs. 12,898. Plants and trees valued at Rs. 538 were issued free of charge, so that the actual deficit on the year's work was Rs. 2,422.

(*c*) *Khusru Garden, Allahabad.*—The expenditure during the year amounted to Rs. 3,408 and the receipts to Rs. 2,257 as compared with Rs. 3,990 and Rs. 2,367, respectively, in the preceding year. The decrease of Rs. 110 in receipts is reported to be chiefly due to the fact that there was less demand for grass in 1895-96 than in the previous year.

(*d*) *Táj Garden, Agra.*— The receipts and expenditure fell from Rs. 4,715 and Rs. 15,992 in 1894-95 to Rs. 3,763 and Rs. 15,535 in 1895-96. The decrease of Rs. 952 in receipts is for the most part due to diminished income from sale of flowers, seeds and plants.

(*e*) *Muktesar Garden, Naini Tal.*—The financial results of the year were highly satisfactory. The receipts rose from Rs. 393-7-0 in 1894-95 to Rs. 938-4-3 in 1895-96. The credit is due to Mr. Bamber, who remained in charge of the garden throughout the greater part of the year. Mr. Hope, while in charge of this Department, visited the garden early in October 1895, and suggested several improvements to be carried out in the garden, one of which was the experimental cultivation of clover in vacant places between the apple trees. At the recommendation of the Commissioner of Kumaun a quantity of clover seeds was obtained from England and sent to the garden for experiment. It is much to be regretted that Mr. Bamber has resigned his appointment under the Government of India, and his services will no longer be available for the nursery.

## SECTION VI.

### Introduction of Agricultural Improvements.

25. **Agricultural shows.**—During the year under report agricultural shows were held at Kakora (Budaun), Rámpur, Khairabad (Sitapur), Aligarh, Bulandshahr, Muzaffarnagar and Meerut. The Department was represented at all these shows by the Assistant Director; the Director, Mr. Baillie, was also present at the Nauchandi fair at Meerut. All the shows were attended with complete success except that at Khairabad (Sítapur), which was not so successful as in previous years. The improved implements of the Department were exhibited for the first time at Kakora and excited great interest among the agricultural classes. The improved Baldeo plough and the Cawnpore chain pump proved very efficient implements in the eyes of native cultivators, and a large number of the ploughs and a few pumps were purchased by them at the fair. Eri silk worms reared at the Cawnpore Farm were shown at Rámpur. Ploughing matches were held at all the shows, and in these competitions the Baldeo plough and the Watt's plough received the highest awards. Similarly the chain pump

was worked against the swing basket, the "R. Hunt" Kibbler against the native grinding mill, and the Simplex chaff cutter against the *gandása*, and in each case the work done by the improved implements was unreservedly admitted to be superior. The *gur* made at the Cawnpore Farm was adjudged superior to all other samples exhibited at Bulandshahr. As observed in previous years these fairs afford to the Department the best opportunities of bringing its improved implements and the superior produce of the Cawnpore Farm to the notice of the agricultural public. The Baldeo bálti, a water-lift lately invented by Baldeo, the mistri of the Cawnpore Farm, for raising water from tanks or canals attracted particular attention at the Bulandshahr and Aligarh shows. One lift was sold at each of these fairs, and an indigo planter at Bulandshahr expressed a desire to enter into a private contract about the bálti with the inventer, Baldeo, in order to extend the use of the lift in the locality. At the Bulandshahr show the Assistant Director discussed with the Commissioner, Mr. Harington, the latter's proposal to award medals to zamíndárs who should accomplish some substantial work in the direction of agricultural improvement; the proposal was subsequently brought before the committee of the show. Briefly stated, it was to the effect that a silver medal might be awarded every year, or alternate year, to the zamíndár who had during the period extended the cultivation of some kind of good seed in his estate and exhibited a sufficient number of samples of the produce, or through whose efforts cultivators might have adopted the use of any recognised useful implements, or who had worked zealously in the matter of cattle breeding. It is hoped that these proposals if acted upon might lead in time to some substantial improvement in the agriculture of the district; and they might be adopted in other districts also. Besides awarding prizes for agricultural produce, implements and cattle, the Assistant Director delivered lectures in Urdu on different agricultural subjects at the various shows and where necessary made suggestions for improvements in the management of agricultural sections. The only important agricultural implement worthy of special notice exhibited by a party other than the Agricultural Department was a sugar mill brought out by Mr. Jones of Nahan for exhibition at the Nauchandi fair (Meerut); the Department has recently obtained a mill of this description which will be tried in the ensuing cane-crushing season. In most of the shows the highest prizes for agricultural implements of improved design were carried off by Baldeo, the head mechanic of the Cawnpore Farm workshop.

26. **Distribution of implements.**—The subjoined statement shows the distribution of implements during the year under report and the preceding year :—

| Name of implements. | 1894-95. | | | | 1895-96. | | | |
|---|---|---|---|---|---|---|---|---|
| | Sold. | Trial. | Hire. | Total. | Sold. | Trial. | Hire. | Total. |
| Ploughs ... ... ... ... | 76 | 19 | 30 | 125 | 182 | 16 | 14 | 212 |
| Chain pumps ... ... ... | 11 | 1 | 3 | 15 | 9 | 5 | 6 | 20 |
| Baldeo water-lift ... ... ... | 1 | ... | ... | 1 | 2 | 1 | ... | 3 |
| Baldeo flour mill ... ... ... | ... | ... | ... | ... | 4 | ... | ... | 4 |
| Grain kibbling mills ... ... ... | 19 | 1 | ... | 20 | 13 | ... | ... | 13 |
| Chaff-cutters ... ... ... | 9 | ... | ... | 9 | 10 | ... | ... | 10 |
| Sugar-pan ... ... ... | 1 | ... | ... | 1 | ... | ... | 1 | 1 |
| Horse hoe ... ... ... ... | ... | ... | ... | ... | 1 | ... | ... | 1 |
| Harrows ... ... ... ... | 1 | ... | ... | 1 | 3 | ... | ... | 3 |
| Dredgers ... ... ... ... | ... | 2 | 5 | 7 | ... | 1 | 7 | 8 |
| Boring tools ... ... ... | ... | 7 | 1 | 8 | ... | 10 | ... | 10 |
| *Details of ploughs.* | | | | | | | | |
| Kaisar plough ... ... ... | 7 | ... | ... | 7 | 6 | ... | ... | 6 |
| Baldeo „ ... ... ... | 18 | 3 | 3 | 24 | 30 | ... | ... | 30 |
| Improved Baldeo plough ... ... | 28 | 2 | ... | 30 | 118 | 3 | ... | 121 |
| Watt's chain „ ... ... | 22 | 14 | 27 | 63 | 21 | 13 | 14 | 48 |
| Watt's beam „ ... ... ... | 1 | ... | ... | 1 | 7 | ... | ... | 7 |
| Total ... | 76 | 19 | 30 | 125 | 182 | 16 | 14 | 212 |

There has been a marked increase in the number of ploughs sold during the year under report. Of these the "Baldeo" and the "Improved Baldeo" secured the largest sale; these ploughs being cheap and efficient are finding favour with the agricultural classes, and they were sent to places in Bengal, the Panjáb, the Central Provinces and Bhopál, while certain cultivators came from Farukhabad to buy them at the Department's workshop attached to the Cawnpore Farm. The "Watt's chain" and "Watt's beam ploughs" are also regarded as very efficient implements by native agriculturists who can afford to use bullocks of fairly large size. There was a decrease in the sale of grain kibblers and a slight falling off in that of the chain pumps, but the number of pumps given on hire and trial was larger than in the past year. There has also been an increase in the number of harrows, Baldeo water-lifts and chaff-cutters distributed during the year. Owing to the failure of the monsoon rains, the demand for the chain pumps rose considerably towards the close of the year and attempts have been made to satisfy the indents with all possible promptness. It is noteworthy that landholders have lately come forward to purchase the more expensive chain pumps worked with cattle gear. The Baldeo flour mill is a new invention brought out by Baldeo, the head mechanic of the Cawnpore Farm workshop. The mill was worked before His Honor the Lieutenant-Governor on the occasion of his visit to the farm in January 1896, and under His Honor's orders a mill was sent to each of the central jails at Agra, Allahabad and Benares for trial. The results of the trials showed that there were some slight defects in the mill which Baldeo has been trying to remove, and a mill with improvements recently devised is now under trial. One mill was purchased by a native of Gwalior. A revised illustrated catalogue of the agricultural implements kept by the Department for sale was published during the year under report.

27. **Distribution of Seed.**—The following table shows the distribution of various kinds of seed during the year under report and the preceding year:—

| Seed. | Quantity. | |
|---|---|---|
| | 1894-95. | 1895-96. |
| | lbs. | lbs. |
| Wheat ... ... ... ... | 12,054 | 160,102 |
| Barley ... ... ... ... | 5 | 6 |
| Oats ... ... ... ... | 13,668 | 6,031 |
| Sorghum ... ... ... ... | 50 | 123½ |
| Guinea ... ... ... ... | ½ | *Nil.* |
| Reana luxurians ... ... ... | 10 | *Nil.* |
| Bájra ... ... ... ... | 451 | 420 |
| Arhar ... ... ... ... | 574 | *Nil.* |
| Clover ... ... ... ... | ... | 22 |
| Paddy ... ... ... ... | ... | 837 |
| Lucerne ... ... ... ... | 71 | 44½ |
| Maize ... ... ... ... | ... | 87 |

The very high figures under wheat include an item of 150,000 lbs. supplied during the year under report to the Director, Land Records, Burma, for experimental cultivation in the Shan States. This wheat was procured under special arrangements from the districts of Meerut and Muzaffarnagar in August last. The comparatively small distribution of oats is due to the fact that the produce of oats at the farm, and consequently the stock at the seed store, was small, and good seed suitable for distribution could not be procured in the local market. The paddy was procured from various districts of these Provinces and supplied to the Emigration Agent, Calcutta, who asked for several varieties of it for cultivation in the Fiji Islands.

The maize distributed was that of the Jaunpur variety grown at the farm. Besides the above, a quantity of *Inga dulcis* and babul seeds was supplied to the Court of Wards' Estate, Bara Banki, for cultivation on waste lands on the recommendation of Dr. Leather, Agricultural Chemist to the Government of India.

28. **Agricultural and Local Associations.**—There was no meeting of the Provincial Agricultural Association during the year under report. Of the branch associations the Porter Agricultural Association of Baraun in the Allahabad district held a meeting towards the close of the year under report, Mr. Bird, the then Collector of Allahabad, being in the chair. The resolutions passed at the meeting were to the effect that all the members of the Association should exert themselves in introducing improved agricultural implements and Muzaffarnagar wheat seed in their respective estates; that they should procure good seed for their tenants in the present season of scarcity, and that the reports of the Association for 1302 fasli and 1303 fasli be published and distributed as usual. The Association's report for 1302 fasli was already noticed last year. The report for 1303 fasli received recently is a record of unfavourable results both in the kharíf and rabí crops owing to insufficient rainfall. The efforts of the Association towards extending the cultivation of sugarcane are giving satisfactory results, as the area under this crop in the pargana where the influence of the Association is greatest is increasing year by year.

29. **Agricultural Journal.**—Besides circulating widely in the North-Western Provinces and Oudh the Agriculture Journal was issued during the year under report to several of the Panjáb districts and also to places in the Bombay and the Madras Presidencies. The total number of copies issued at the close of the year was 343 as compared with 392 last year, the falling off in circulation being due mainly to the fact that names of such subscribers as failed to send in their subscriptions in advance were struck off the register under the existing rules. The number of subscribers has since risen to 353. The arrangement and the nature of the subjects published in the journal continued to be the same as in former years, and the paper is read with interest by the intelligent Urdu-reading agriculturist; articles published in it are not infrequently copied by the vernacular press.

The Hindi edition of the journal published by the Manager of the Lucknow Printing Press has not proved a success. The number of subscribers to this edition on the books of the Manager on 30th September 1896 was as low as 10, and even these men, the Manager reports, would not pay their subscriptions. Efforts were made to improve the circulation, and the assistance of District Officers was invoked with some temporary success, but the number of subscribers has again fallen so low that the Manager of the press has decided to abandon the publication. The failure may be due in part to the scarcity which has necessitated a reduction of all expenditure, but it is remarkable that a former attempt made by the Department in 1889 to popularise the Hindi journal resulted similarly in complete failure.

The total receipts from subscriptions to the Urdu journal during the year under report amounted to Rs. 274-11-0 and the cost of publication to Rs. 360.

30. **Boring apparatus.**—During the year under report trial borings previous to sinking wells were made in the districts of Muzaffarnagar, Aligarh, Bulandshahr, Cawnpore, Jaunpur, Garhwál, Naini Tal and Hardoi. The boring tools were sent to the two hill districts at the request of the Commissioner of the Kumaun division in order to find out whether wells for drinking water could be constructed in the Kumaun Bhábar. The experiment was a failure as the tools could not penetrate the ground. Elsewhere the work done was fully satisfactory. The total number of borings during the year was 50 against 86 last year. The decrease was mainly due to a slackened demand for the services of well-sinkers throughout the greater part of the year. The number of men on the staff of well-sinkers was three, but in compliance with the orders of Government in reviewing the last year's report steps were taken to train more men in the art of boring, and five men have been so far trained. Steps

were taken to make it widely known that the services of these men were available, with the result that applications have of late come and in considerable numbers, and with the limited number of sets of boring apparatus in the stock of the Department it has not been possible to satisfy the requirements of every district promptly. A new set has been recently purchased and steps are being taken to buy more sets. The Department arranged to provide a set of tools for the Court of Wards' Estate, Bara Banki, and one for the Bulrámpur Estate. The total charge met by Government on account of the wages of the well-sinkers, purchase and repair of implements, freight, &c., amounted to Rs. 137-4-4, showing an increase of Rs. 85-15-7 as compared with last year's expenditure. The increase is due to the slackened demand in the earlier part of the year, as the well-sinkers had to be paid by the Department for a longer period than in the last year.

## SECTION VII.

### Registration of Traffic.

31. The following traffic was registered during the year 1895-96 :—

(1) Foreign traffic with Thibet and Nepál.
(2) Rail-borne traffic.
(3) Inland road traffic.

The statistics of traffic have been reviewed in detail in the Annual Reports on Foreign and Inland Trade; and a brief notice of them will therefore be sufficient in this report.

32. **Foreign traffic.**—The total traffic of these Provinces with the countries of Thibet and Nepál is shown in the following table. It has improved both as regards weight and value during the past two years :—

| Direction of traffic. | Weight in maunds. | | Value in rupees. | |
|---|---|---|---|---|
| | 1894-95. | 1895-96. | 1894-95. | 1895-96. |
| | Mds. | Mds. | Rs. | Rs. |
| Imports— | | | | |
| From Thibet .... ... ... | 52,712 | 57,605 | 6,36,066 | 5,16,332 |
| From Nepál .... ... ... | 18,41,535 | 19,87,967 | 52,12,043 | 59,76,144 |
| Total .... | 18,94,247 | 20,45,572 | 58,48,109 | 64,92,476 |
| Exports— | | | | |
| To Thibet .... .... ... | 47,148 | 69,626 | 2,47,032 | 4,14,244 |
| To Nepál .... .... ... | 2,14,598 | 2,20,201 | 39,66,927 | 31,86,826 |
| Total ... | 2,61,746 | 2,89,827 | 42,13,959 | 36,01,070 |

**Thibet.**—The import trade shows a slight increase of 4,893 maunds in weight owing to larger receipts of salt, while a decrease of Rs. 1,19,734 in value was caused by diminished imports of borax, wool, horses and cattle. A substantial improvement took place in the export trade in consequence of the despatch of larger quantities of cotton goods, grain and sugar. The trade in borax is gradually declining, while that in salt and wool shows no marked variation. The export trade in grain was perhaps depressed by the high prices lately prevalent in Himálayan districts. The exports of cotton goods and sugar for 1895-96 are the highest on record; for sugar they are nearly three times as high as during the best of the past twelve years and more than four times higher than the average for that period.

**Nepal.**—In 1894-95 there was some revival in the import trade from Nepál. In the year under report a further improvement took place both in the weight and value of the articles imported; the increase in weight over last year being 1,46,432 maunds and in value Rs. 7,64,101. The expansion in the import trade, though shared

by all the important articles of import except timber, occurred chiefly under the head "grain and oilseeds," and may be attributed to the short crops of these Provinces. The import trade in hides recovered slightly; while that under timber declined by over one lakh of maunds. The exports to Nepál increased by 5,603 maunds in weight and fell off by nearly 8 lakhs of rupees in value. The slight increase in the weight of exports occurred under salt and sugar, while the very large decrease in value was caused by diminished despatch of cotton goods, the export of which was unusually large in 1894-95 and more than sufficed for local consumption in that year. Traders with Nepál complain of the imposition of local taxes both on imports and exports; but it does not appear so far that the volume of trade has been materially affected.

33. **Rail-borne traffic.**—The total traffic of the year is compared below with that of the preceding year :—

| | 1894-95. | | 1895-96. | |
|---|---|---|---|---|
| | Mds. | Rs. | Mds. | Rs. |
| Imports ... ... ... | 3,94,76,973 | 15,59,26,358 | 3,50,59,695 | 14,99,77,347 |
| Exports ... ... ... | 2,67,24,171 | 20,09,51,497 | 2,54,22,478 | 18,97,16,134 |

The extension of the import traffic and decline in exports, which were the marked features in the statistics of 1894-95, have been maintained, though not to the same amount, during the year under report. The imports were on a much smaller scale than in the previous abnormal year; but they far exceeded the average imports of the past five years. The volume of the export trade shows a continuous decline during the past two years.

The exports of cotton rose from 5,64,577 maunds to 16,49,137 maunds, the largest figures during the last six years. The imports at the same time rose from 2,00,162 to 2,33,061 maunds. The value of the net exports ammounted to about two crores and twenty-eight lakhs of rupees as compared with about sixty lakhs of rupees in the year before. The indigo crop was the best that has been known for some years past and the exports rose from 48,600 to 68,838 maunds. The price realized amounted to one crore and 29 lakhs of rupees as compared with 86¾ lakhs of rupees in the preceding year. The exports of ghi also rose from 2,59,368 to 2,71,058 maunds, while the imports fell off by 14,000 maunds. On the other hand, the losses to the Province from other agricultural products were severe. The exports of oilseeds declined from 41,76,931 to 26,51,524 maunds, while the imports rose from 3,51,582 to 5,37,980 maunds. The exports of sugar likewise diminished from 53,43,562 to 47,13,996 maunds, while the imports rose from 2,24,833 to 3,54,707 maunds. The exports of wheat declined from 37,15,970 to 35,80,712 maunds, and the imports from 31,05,056 to 14,33,991 maunds; the net exports of wheat being 21,46,721 maunds as compared with 6,10,914 maunds in the year before. The imports of grains other than wheat declined from 143 to 78 lakhs of maunds; and the exports from 39 to 24 lakhs of maunds. The net imports retained for local consumption amounted to 54 as compared with 103 lakhs of maunds.

34. **Road traffic.**—The posts located in 1894 for the registration of road traffic in the districts of Meerut, Bareilly, Bijnor, Budaun, Moradabad, Sháhjahánpur, Pilibhít and Naini Tal were maintained during the year under report. The registration of three years' traffic in Rohilkhand will be completed on 31st March next, and it is intended to move the registration staff next year to the Meerut division in compliance with the wishes of the Public Works Department.

35. An Inspector of Traffic attached to the Department was deputed to the districts in the Agra and Lucknow divisions to make inquiries into the state of the principal indigenous handicrafts of those districts. A summary of the information collected was given in the Inland Trade Report for the year ending the 31st March 1896.

## SECTION VIII.

PROMOTION OF HORSE-BREEDING OPERATIONS THROUGH CIVIL AGENCY.

36. The number of Provincial horse stallions rose from 49 in 1894-95 to 58 in 1895-96, but that of the Imperial horse stallions fell from 102 to 96. Of these 48 Provincial and 67 Imperial stallions were at stud work, and they respectively covered 2,465 and 3,034 mares during the year; last year 1,957 and 3,041 mares were covered by 38 Provincial and 78 Imperial stallions. Besides these there were 18 horse stallions in charge of Court of Wards' estates and private persons; the incomplete returns received from the persons in charge show 330 coverings during the year.

37. There were 107 Imperial donkey stallions at the close of the year 1895-96 or three more than in the preceding year. Of these 79 donkeys were at work during the year; they covered 3,842 pony and donkey mares as compared with 3,606 coverings by 71 Imperial donkeys in 1894-95. The eight Provincial and Court of Wards' donkeys which were at stud work in various districts are reported to have covered only 56 mares during the year.

38. Outbreaks of cattle disease were reported from 27 districts during the year, rinderpest having occurred in 26 districts. The Veterinary Assistants, of whom there were fifteen, were employed in dealing with cattle disease in the districts where they were stationed; seven of them were also sent on special duty to other districts for the same purpose. A small dispensary exists for the treatment of cattle at Cawnpore under the Assistant Director of this Department.

39. Veterinary-Lieutenant Loughlin remained in charge of the Civil Veterinary Department during the year. He inspected Imperial and Provincial stallions at various stands in these Provinces, attended eight shows, investigated outbreaks of glanders at Lucknow and on the Saháranpur-Rájpur dák line, visited Káthgodám-Naini Tal dák line, was on the Board of Examiners at Ajmere Veterinary School and submitted three reports, one on the Provincial and two on the Imperial Military and Revenue sections of his work. Veterinary-Lieutenant Loughlin has tendered his resignation of the office of Superintendent of the Department and is expected to be relieved of his duties in the present touring season. The loss of his services is much to be regretted.

40. **Cattle-breeding.**—During the year there were altogether 25 Government bulls at work in 18 districts of the united provinces, including six supplied by this Department in 1895-96. Of the 25 bulls 19 were of Hissár breed, three of Kanwaria, two of Kosi and one of the Parehar breed. In general the results of breeding from Hissár bulls were favourably reported on by District Officers, though in some districts the Hissar bred calves are regarded as slow movers in comparison with the local breed. In Oudh and parts of the adjoining districts of Rohilkhand, the Khairigarh and Parehar bulls of Kheri, which are far less expensive than the Hissár bulls, are highly thought of, and they appear to be better suited to breed from in these localities.

41. Of the small sized Brittany cattle, which were received about 9 or 10 years ago from the Government of India for trial in the Himálayas and maintained at the two gardens near Almora, only two cows were alive at the end of November 1895, of which one was reported to be very old and not in good condition. The pure bred cattle were found to be delicate in constitution and unsuited in frame for draught or burthen purposes, and on Kumaun fodder not very distinctly better than native hill cattle. The half bred cattle are hardier than the pure bred and a considerable herd of these has grown up. These cattle are not materially better milkers and they are inferior for draught purposes to the indigenous breed.

## SECTION IX.

MISCELLANEOUS.

42. **Dairies.**—The Aligarh Dairy Farm was throughout the year held on lease by Mr. Keventer, formerly the Dairy Superintendent under this Department. The sale of butter has greatly extended and has necessitated considerable additions to the

dairy buildings. Cheese making has also been taken up by Mr. Keventer and it has been shown that excellent cheese can be manufactured in India. To dispose of the separated milk a poultry yard and piggery have been started. The question of sale of the usar reserve at Cherat to Mr. Keventer was referred to Government and sanction has been received since the close of the year to the offer of the reserve on certain terms. Dairy farms at the Bareilly Lunatic Asylum and in several cantonments started on the model of the Aligarh farm have been locally very successful.

43. **The Agricultural School.**—The class of students that was formed in 1894 completed its course of two years' study and had its final examination in April last. Dr. Leather undertook the examination in agriculture, chemistry and agricultural chemistry; Mr. Scott in surveying and Mr. Baillie in botany. The standard of examination in all the subjects was somewhat raised this year but the students did well on the whole. Dr. Leather's report on the results of the examination is as favourable as in last year and attention has been given to the suggestions made by him. Eighteen students appeared in the final examination of the school, of whom sixteen passed, four being in the first division and the rest in the second division. For two of the optional subjects of the School Final Examination of the Allahabad University held in April 1896, *viz.* (1) agriculture with surveying, and (2) elementary physics and chemistry, the class that was formed in July 1895 appeared after a course of one year at the school. Out of the twelve students who appeared nine passed in both subjects; one failed in agriculture and two in physics and chemistry. The senior students who passed out in April last had small plots under oats and sugarcane assigned to them, all operations of cultivation being done entirely with their own hands. The present senior students, *i.e.*, those belonging to the class formed in 1895, also grew sugarcane on small plots: in both cases the crops were carefully tilled and the yield good, and as remarked in last year's report the students take much interest in their field work and perform it cheerfully and willingly. The Agricultural Students' Association and the reading room referred to in last year's report have been working vigorously during the year, and football and gymnastics have been going on as usual. In addition to these the students have organised riding and lawn-tennis clubs, which have materially added to the opportunities for physical development.

Mr. Budden, Inspector of Schools, visited the school in December 1895, and was much impressed with the work of the school. His report has already been published in the *Gazette* of 30th May 1896 under the orders of Government. In the new class formed in July last there are 18 students in all, of whom five are Muhammadans, nine Kayasths, one Ját, one Baniya, and two Bráhmans. Six have passed the Entrance Examination, two the School Final Examination of the Allahabad University and nine the Middle Class Anglo-Vernacular Examination. This year's admissions consist of a better class of students both in point of education and social status. Of the 18 students in the class 14 are candidates for kanúngoship and other revenue service, one intends to be a teacher, and three are fitting themselves for agriculture or estate management. As regards the utilization of the services of the passed students referred to in the orders of Government reviewing the last Annual Report of the Department, much was done in the course of the year under report. A list of the unemployed passed students of the school was submitted to the Board of Revenue, who have circulated it to all Commissioners and District Officers. Thirty-three students in all have passed from the school; of whom nine are at present on famine duty as naib-tahsíldárs and four are supervisor kanúngos; eleven students are employed as assistant kanúngos or in other capacities in the land records staff; two have got miscellaneous appointment in the service of Government, the Court of Wards have employed four and native States three. The boarding accommodation and class rooms at present available are found insufficient for the ordinary students of the school, and will require extension when the question of the permanent location of the school is finally decided.

44. **Lucknow Museum.**—The total number of additions made during the year under report to the various sections of the Museum amounted to 3,573 specimens, of which

493 specimens were obtained by purchase, 73 were collected by the Museum staff, and 3,007 were presented by various persons and associations. The principal additions were made to the Library and Numismatic sections, which received 2,081 and 1,247 specimens respectively. Some of the additions made to the Archæological section were very interesting as bearing on the question of the origin of Jainism. The interest taken by the public, and especially by the native public, in the Museum, as evidenced by the number of visitors, continues to increase. There were 190,072 visitors during the year as compared with 174,240 in the previous year; the daily average was 519, and on one public holiday the attendance reached the very high figure of 12,228. The expenditure on the Museum was Rs. 9,685-3-10 and the receipts Rs. 1,371-8-9.

45. **Sericulture.**—The experiments hitherto tried in this direction lead to the conclusion that it is almost impossible to rear silk-worms in the hot climate of these Provinces. As reported last year, a fresh supply of 100 live cocoons was obtained from Assam. The worms produced only three cycles up to the end of February 1896. The first cycle was a fairly successful one, the second was a very poor one, and the third was a total failure as the worms were killed by the heat. In view of these discouraging results it is now intended to give up the experiment.

46. **Crop experiments and crop forecasts.**—Crop cuttings were made in the autumn harvest of 1895 and the spring harvest of 1896 with the object described in last year's report. As the period of five years for which a return has to be made to the Government of India will end in June next, the attention of District Officers has been drawn to the need for a larger number of cuttings being made in the kharíf and rabí of the present agricultural year. The number of measuring chains and steel yards supplied to districts for use in making crop cuttings amounts to 31 and 57, respectively. Forecasts on indigo, cotton, *til*, wheat, linseed and rapeseed crops were issued as usual during the year under report. As remarked in last year's report the area statistics required for forecast reports are obtained from the crop returns filed by patwáris, while the condition of crops is judged from the reports received from selected zamíndárs on a system introduced several years ago. The question whether these reports can be so supplemented as to ensure greater accuracy is at present under consideration.

47. **Preservation of fruits and vegetables by evaporation.**—This subject is at present receiving considerable attention in England and elsewhere owing to the success which has been achieved by various processes in America and more lately in Germany. With a view to trying the preservation of Indian fruit and vegetables by similar processes an American fruit and vegetable evaporator has recently been obtained by the Department from England and placed under Mr. W. Gollan in the Botanical Gardens at Saháranpur. It is proposed to start experiments with the evaporator on the ordinary fruit of the plains as well as on the hill grown fruit from the Arnigarh Garden. A very cheap German evaporator is also being obtained for experiments at Muktesar.

An enterprize of a similar kind recently started in Dehra Dún deserves notice. A resident of Dehra has for some years been experimenting on the preservation of Indian fruit by canning, and, working with the assistance of Mr. W. Gollan, succeeded in 1895 in preserving the leading varieties of fruit in such a way as to retain the delicate and aromatic flavour of the fruit. The enterprize is now being commercially carried on by a canning company; mangoes, leechees, Cape gooseberries, guavas, peaches and most other varieties of Indian fruit are preserved. Due regard is paid to the appearance of the tins, and in the local market Indian fruit so preserved ought to become a formidable rival to imported fruit, while the industry is capable of development in other directions. Mr. Gollan also assisted with his advice in the establishment of a canning company in Kashmir.

48. **Specification of inventions.**—Fourteen applications for leave to file specification of inventions were received for opinion from the Government of India. They were examined by the Assistant Director and the opinions recorded by him were forwarded to the Government of India.

49. **General.**—My connection with the Department is recent, and my function in writing this report has been merely the compilation of the results of work done by or under the direction of my predecessors. I hesitate therefore to offer any opinion of my own regarding the merits of the officials employed in the Department. Mr. Baillie when leaving the Department placed on record his appreciation of the excellent services of Munshi Saiyid Hussain, the Personal Assistant. Regarding Mr. P. V. Subbiah, Principal of the Agricultural School, Mr. Baillie has remarked that he is an unqualified success, both as Principal of the School and Superintendent of the Farm. Babu Lachman Pershad, who was on special duty most of the year in connection with the preparation of pargana books, has been appointed to officiate as a Deputy Collector, a fact which shows with sufficient clearness the continued excellence of his work.

I have the honor to be,

SIR,

Your most obedient servant,

W. H. MORELAND,

*Director.*

# APPENDIX

*Statement showing the Receipts and Expenditure of the Department of Land Records and Agriculture, North-Western Provinces and Oudh, for the financial year* 1895-96.

| Heads of charges. | Budgetted allotment. | Actual expenditure. | Savings on budgetted expenditure. | Excess. | Receipts paid into Treasury. | Budgetted receipts. | Remarks. |
|---|---|---|---|---|---|---|---|
| | Rs. a. p. | Rs. a. p. | Rs. a. p. | Rs. a. p. | Rs. a. p. | Rs. a. p. | |
| Gazetted officers' travelling allowance ... ... ... | 3,800 0 0 | 3,794 14 0 | 5 2 0 | ... | ... | ... | |
| Office establishment ... ... ... ... | 24,716 0 0 | 24,319 14 1 | 396 1 11 | ... | ... | ... | |
| Ministerial officers' travelling allowance ... ... ... | 1,600 0 0 | 1,029 10 3 | 570 5 9 | ... | ... | ... | |
| Kanúngo Inspectors' establishment ... ... ... | 5,500 0 0 | 5,267 12 1 | 232 3 11 | ... | ... | ... | |
| Ditto travelling allowance ... ... ... | 1,900 0 0 | 1,668 5 6 | 231 10 6 | ... | ... | ... | |
| Office contingencies ... ... ... ... | 6,468 0 0 | 5,954 13 11 | 513 2 1 | ... | ... | ... | |
| Traffic registration charges ... ... ... ... | 22,000 0 0 | 21,909 6 10 | 90 9 2 | ... | ... | ... | |
| Experimental Farm establishment ... ... ... | 3,816 0 0 | 3,656 2 1 | 159 13 11 | ... | ... | ... | |
| Ditto contingencies ... ... ... | 8,404 0 0 | 8,609 4 10 | ... | 205 4 10 | 3,150 4 2 | 4,000 0 0 | |
| Ditto and workshop contingencies ... ... | 3,857 13 0 | 3,857 8 1 | 0 4 11 | ... | 2,849 12 0 | 4,200. 0 0 | |
| Well experiments ... ... ... ... ... | 92 3 0 | 92 3 0 | ... | ... | | | |
| Reclamation of waste lands ... ... ... ... | 3,475 0 0 | 3,474 8 1 | 0 7 11 | ... | * 6,902 9 2 | 1,743 0 0 | *Includes Government Dairy dues and outstandings realized during the year. |
| Dairy experiment charges ... ... ... ... | 500 0 0 | 495 14 6 | 4 1 6 | ... | ... | ... | |
| Agricultural shows ... ... ... ... | 600 0 0 | 544 6 9 | 55 9 3 | ... | ... | ... | |
| Breeding bull and stallion charges ... ... .. | 2,000 0 0 | 1,596 2 6 | 403 13 6 | ... | ... | ... | |
| Imperial Institute, London ... ... ... ... | 500 0 0 | 181 0 10 | 318 15 2 | ... | ... | ... | |
| Miscellaneous experiments ... ... ... ... | 805 0 0 | 804 0 0 | 1 0 0 | ... | ... | ... | |
| Agricultural School ... ... ... ... | 5,100 0 0 | 5,077 10 0 | 22 6 0 | ... | ... | ... | |
| Ghâzipur Stud Farm ... ... ... ... | ... | ... | ... | ... | 7,859 10 0 | 9,057 0 0 | |
| Miscellaneous receipts ... ... ... ... | ... | ... | ... | ... | 445 2 5 | 500 0 0 | |
| Total ... | 95,134 0 0 | 92,333 9 4 | 3,005 11 6 | 205 4 10 | 21,207 5 9 | 19,500 0 0 | |

NOTE.—Certified that the receipts in this office were checked in the manner prescribed in G. O. No. 34, dated 5th October 1882.

W. H. MORELAND,
*Director of Land Records and Agriculture,*
*N.-W. Provinces and Oudh.*

# ORDERS OF GOVERNMENT.

No. $\frac{1266}{\text{I}-\frac{36\text{B}}{12}}$ OF 1897.

FROM

THE CHIEF SECRETARY TO GOVERNMENT,

N.-W. PROVINCES AND OUDH,

To

THE DIRECTOR OF LAND RECORDS AND AGRICULTURE,

N.-W. PROVINCES AND OUDH.

DATED ALLAHABAD, THE 3RD MAY 1897.

SIR,

REVENUE DEPT.

I AM directed to acknowledge the receipt of Mr. Moreland's letter No. $\frac{622}{\text{VIII}-201}$, dated 11th January 1897, which formed his report on the operations of the Department of Land Records and Agriculture for the year ending 30th September 1896, and to communicate the following remarks.

2. Paragraphs 2—4 describe the tours and inspections made by the Director and Assistant Director. Section I (paragraphs 6—12) deals with the maintenance of village records, while Section II enumerates the steps which have been taken to collect that statistical information which will assist the local officers in their treatment of deteriorated and precarious areas. It is sufficient to note that the report in these matters follows the lines laid down by the Government of India in their Resolutions on the Agricultural Conferences held during the past few years. The orders of Government on the subject of Sections I and II will, as usual, be issued in the review of the Revenue Administration Report, but it may here be observed that much progress has been made in these provinces in the direction of securing a sound knowledge of surveying and the system of land records in kánúngos and tahsíl officials, as well as an intelligent use of the pargana book by superior officers. Much has also been done towards improving the class of candidates for kánúngoships by the promotion of specially deserving kánúngos to superior posts. These matters are important among those on which the Supreme Government has laid special stress.

3. The remainder of the report deals principally with the agricultural work of the Department. The experiments in the reclamation of *úsar* were continued at Juhi, in the Cawnpore district, and at Gursikran, in the Aligarh district. At Juhi, where the operations are more particularly confined to fuel and fodder, the dryness of the season prevented the success of the various sowings made, and young trees which had survived from previous years were only kept alive by constant waterings and attention. Trials were made with various kinds of trees, some seeds of the papilionaceous order being sown for the first time, but without success. Some fodder crops and maize did well, but

the rice failed from want of rain. At Gursikran the experiments are more directed to the conversion of barren land into soil fit for crops and fodder, though fuel-producing trees are also being sown. A successful attempt was made to grow fodder crops in the hot weather months, which were sown in April and yielded two crops—in July and in October,—showing that with irrigation such crops can be grown in poor soils. The value of hay grown on *úsar* is beginning to be recognised. The effect of oil-cake feeding on cattle manure was examined, and an experiment with regard to the quantity of firewood required by a family in a year was carried out.

At Cherat, which has been transferred to Mr. Keventer with the Government Dairy at Aligarh, the management is not now in the hands of the Department. Mr. Keventer, however, continues to manure part of the area and to grow crops and fodder, and the reclaimed land is not likely to deteriorate. The soil at Amramau, the plot which was sold by Government in 1892 after reclamation, is also said to maintain its condition in spite of some neglect.

4. Investigations of a different character were conducted at the Cawnpore Experimental Farm, at certain private farms, and on some Court of Wards' estates. At Cawnpore the principal enquiries of the year were directed to ascertaining the values of different manures applied to various crops, the effects of deep and shallow ploughing, the possibility of introducing certain foreign staples, such as American cotton and Canadian oats, and the outturn of different varieties of sugarcane. At the Demonstration Farm at Meerut—a private farm managed by the Collector—and at the Jatau Farm in the Agra district experiments of a similar character were carried out, while in some estates managed by the Court of Wards areas were set apart for like purposes.

5. The introduction of improved agricultural implements received attention during the year as usual. The various agricultural shows afforded the Department the means of bringing improved implements to the notice of the agricultural community, and there was an increased demand for the "Baldeo" plough, which is coming to be recognised as a considerable improvement on the ordinary plough, and is at the same time moderately priced. The useful work of distributing selected varieties of seeds was continued, though the general demand was not so great as in the previous year, and the facilities at the disposal of the Department for providing good apparatus and mechanics for well-sinking were considerably increased.

6. The miscellaneous section of the report indicates the continued success of the Aligarh Dairy Farm under Mr. Keventer's management, and of the various local dairies established for the benefit of the troops in some of the large cantonments. The Agricultural School at Cawnpore continued its useful work, and most of the passed students have found employment either on the Land Records staff or in other Government service or in Native States.

7. The statistics of trade with Thibet and Nepal show no very remarkable variation. The principal features of the trade with these countries are a gradual decline in the borax trade with Thibet, an increase in the despatch of cotton goods to Thibet, and a decrease in the same trade with Nepal. There was a large increase in the imports of grain and oil seeds from Nepal. The goods traffic on the railway again showed a volume of imports largely above the average, while the decline noticed in the exports in 1894-95 was continued in 1895-96. The diminution in the exports was serious in the case of oil seeds, sugar, and wheat, and other grains, but there was an enormous rise in the exports of cotton with only a slight increase in the quantity imported, while indigo and *ghí* also were removed in larger quantities. The weight of sugar imported was more than 50 per cent. in excess of the total for 1894-95, but the imports were insignificant as compared with the exports.

8. In conclusion, I am to observe that next year's report will be drawn up on a different plan in accordance with the instructions of the Government of India in their recent Resolution. This Resolution will shortly be communicated to you with the instructions of the Lieutenant-Governor and Chief Commissioner.

I have the honor to be,

SIR,

Your most obedient servant,

H. F. EVANS,

*Chief Secy. to Govt., N.-W. P. and Oudh.*

# REPORT

ON THE

# Operations of the Dept. of Land Records & Agriculture,

## NORTH-WESTERN PROVINCES AND OUDH,

*FOR THE YEAR ENDING 30TH SEPTEMBER 1897.*

*ALLAHABAD:*

North-Western Provinces and Oudh Government Press.

*1898.*

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# REPORT

ON THE

# Operations of the Department of Land Records and Agriculture,

## NORTH-WESTERN PROVINCES AND OUDH,

*FOR THE YEAR ENDING THE 30TH SEPTEMBER 1897.*

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No. $\frac{512}{\text{VIII-240}}$.

FROM

J. S. MESTON, ESQ.,

DIRECTOR OF LAND RECORDS AND AGRICULTURE,
N.-W. PROVINCES AND OUDH,

To

THE CHIEF SECRETARY TO GOVERNMENT,
N.-W. PROVINCES AND OUDH.

*Dated Lucknow, the 5th February* 1898.

SIR,

I have the honor to submit the annual report on the work of this Department for the year ending the 30th September 1897. The report has, under your demi-official instructions, been drawn up in the form prescribed by the Government of India in the final or eighth Resolution of the series issued as a supplement to the *Gazette of India* for 20th March 1897. A little uncertainty has been felt as to the proper grouping of some of the topics usually discussed in the reports of this Department and as to the amount of space that should be allowed to the various subjects for report. But, as far as possible, the spirit of the Government of India Resolution has been observed.

## CHAPTER I.

### PREFATORY.

1. The Assistant Director, Saiyid Muhammad Hadi, M. R. A. C., held charge of the Department in addition to his own duties from the 1st to the 30th October 1896, when he was relieved by Mr. W. H. Moreland, who held the Directorship till the 27th March 1897. The Assistant Director was again in charge of the Department from 28th March to 23rd April, when I took over charge from him. The post of the Assistant Director was held throughout the year by Saiyid Muhammad Hadi.

2. On joining the Department, Mr. Moreland was engaged until 20th December in inspecting the Farukhabad district for a forecast of the results of the coming revision of settlement. Early in January he visited Sháhjahánpur to meet the Senior Member of the Board of Revenue and discussed certain questions regarding survey and settlement. On 14th January he joined his camp at Bareilly, where he held the Kanúngo Examination for that centre, which had been postponed since the last rainy season. He also inspected the work of the Land Records Survey in progress in the Bareilly district. He then marched into Pilibhít and made a forecast inspection of the Bisalpur tahsíl, varied by inquiries into the indigenous processes of sugar manufacture. The rest of the tour was chiefly occupied by an

examination of the survey work in the Sháhjahánpur and Kheri districts. Thereafter Mr. Moreland met the Senior Member of the Board again at Lalitpur; visited the usar reserves at Aligarh, the Demonstration Farm at Meerut and the Saháranpur garden; attended the Bulandshahr fair; and inspected survey work at Meerut and Bahraich. After having started some experiments in sugar manufacture at Cawnpore, he was engaged on inspecting the special office at Basti, when he had to leave the Department and join his new appointment.

Taking over charge on 23rd April, I was unable to do any touring until the rains. During July and August I conducted (assisted by the Assistant Director) Kanúngo Examinations at Bareilly, Aligarh, Meerut, Cawnpore, Lucknow, Gorakhpur, Fyzabad and Benares; inspected the survey offices at Bareilly (where I met the Senior Member of the Board to settle certain pending questions of importance), Meerut and Bahraich; and examined the preparation of the new mauza and pargana registers at Budaun, Basti and Gorakhpur.

3. The Assistant Director, when in sole charge of the Department at the beginning of the year, was unable to go on tour. From the middle of November to the beginning of January his time was fully occupied with the distribution of the large supply of carrot seed imported from Europe and procured in India to be grown in these provinces as a famine crop. In the middle of January he went to Bareilly to assist Mr. Moreland in examining candidates for Kanúngoship at that centre. During the last two weeks of January he inspected the reserves at Gursikran and Chherat and the Demonstration Farm at Meerut.

During the first fortnight of February he was engaged in inquiries in the districts of Agra, Etáwah and Cawnpore as to the earliest and latest dates of sowing and harvesting, with a view to compiling a statement called for by the Board of Revenue; he also inspected crops raised from the imported carrot seed in these districts. In the middle of February he proceeded to Aligarh to show the Director round the reserve at Gursikran, and then went on to Bulandshahr to attend the Agricultural Show. Thereafter he returned to Aligarh to accompany the Director of the Botanical Department, Northern India, during his inspection of the usar reserves. In February and March he carried out several experiments in the manufacture of raw-sugar at Cawnpore and in other districts. Towards the end of March he was again placed in charge of the Department, which he held up to 22nd April 1897 in addition to his own duties. During this period he represented the Department at the Nauchandi fair in Meerut, went to Aligarh to discuss certain experiments with the Agricultural Chemist to the Government of India, and visited Muttra to make enquiries similar to those he had conducted in Agra and to inspect carrot crops. On his return to Cawnpore he examined the students of the Agricultural School in Botany and supervised their final examination in other subjects. He also, at the request of the Director of Public Instruction, examined the students of the Normal Schools of the North-Western Provinces and Oudh in Agriculture and Sanitation. In the first fortnight of May and again in June he made a tour in several districts of Oudh, in order to procure a considerable quantity of agricultural seeds indented for by the Conservator of Forests in Berar, and to collect information regarding the degree of success attained in the cultivation of European carrots. In July and August he assisted the Director in conducting the Kanúngo Examinations at Cawnpore, Bareilly, Aligarh, Lucknow, Gorakhpur, Fyzabad and Benares; he also went to Gursikran to start certain experiments suggested by the Agricultural Chemist. In September he remained busy at Cawnpore with the distribution of the surplus stock of carrot seed and the trial of agricultural implements. In the last week of that month he received the special managers of certain Court of Wards' estates at Cawnpore and discussed with them several practical measures bearing on the improvement of agriculture in their estates. The usar at Juhi was, as usual, frequently visited by him during the year.

4. Mr. G. B. Scott, of the Survey of India, who is attached to the Department as Superintendent of Land Record Surveys, was absent on privilege leave from 30th April

to 26th July 1897. During the rest of the year he was continuously engaged in supervising the work of the six survey parties under his control. During his cold weather tour he examined and reported on the village maps of Etah, Etáwah and Mainpuri in connection with the question of having a resurvey of these districts preliminary to the approaching revision of records. He also visited, more than once, each of the districts under survey and inspected the work both in office and in the field.

## CHAPTER II.

### LAND RECORDS ESTABLISHMENTS.

5. A detailed note on the working of the Land Records staff is submitted to the Board of Revenue for incorporation in its Annual Administration Report; and an epitome of the note was usually placed in this Department's annual report. This course seems unnecessary now, and the present chapter refers only to the subjects discussed in the Government of India's second resolution.

6. *Training of patwáris.*—This was considerably interfered with during the year by the prevailing distress, which prevented pressure being put on patwáris to go through their school course. For the education of the patwári there are now 40 special schools in 39 districts under the control of the district officer, and in 3 districts the patwári is taught in special classes attached to the school at headquarters. Out of the total number of patwáris and assistant patwáris (28,815) in the provinces, 24,201, or 83·99 per cent., had, up to the end of the year, passed through the school course and qualified at the final examination. Of the remainder, 3,326 (11·54 per cent. of the whole) were exempted from qualifying, under orders of the district officer, and by reason of age and long service. There were thus only 1,288 men remaining to qualify, many of whom had been appointed on condition of their passing the prescribed examination within a fixed time. The number of exemptions fell from 3,631 last year to 3,326 this year. It is being steadily curtailed as the older men die or retire and younger men are appointed in their places.

The training of patwáris in the important duty of accurately surveying their own circles has been steadily kept to the front in connection with the cadastral surveys undertaken by this Department. Survey and Record-writing operations were continued during the year in Meerut, Sháhjahánpur, the Lalitpur Sub-division of Jhánsi, Kheri, Bahraich and the Sitapur alluvial mahál. They were begun in Bareilly, and test surveys were made of portions of the Naini Tal Hill Parganas. In each district, before work began, training classes were opened for the patwáris by the survey officer in charge of the operations. And the great bulk of the work of preparing new village maps and revising the village records has been done by the patwáris themselves. To what extent and with what economy this has been effected the following figures will show:—The total area surveyed in 1896-97 amounts to 4,325 square miles, out of which the records for 4,281 square miles have been written up. The total expenditure up to 30th September 1897, including superintendence and instruments, &c., has been Rs. 2,30,708-2-0, giving an average of Rs. 53-5-5 per square mile. This exceeds the cost reported last year by Rs. 6-4-2, as the expenditure per square mile was enhanced by patwáris being largely withdrawn from their survey work to aid in measures for Famine relief, and a number of amíns and muharrirs had to be employed in their place.

Valuable though the work done by the Survey Officers has been, it has not been carried through without considerable difficulty. The task imposed is distasteful to the patwári and kanúngo staff, and every device of passive resistance is employed in the hope of evading it. The difficulty of extracting useful work from the patwáris has been greatest in Oudh, where the patwáris are often inadequately paid, and are frequently the servants of the large landowners rather than of the State. Much patience, tact and firmness are required to get the map and record revision accom-

plished without undue friction. The obstacles to the due progress of survey work mentioned in last year's report have been aggravated by the constant employment of the patwáris in most districts on famine work; but the training that has been received by the patwáris of the large area under survey and by their heirs has been of the greatest use and their outturn of work has been most creditable to the supervising staff.

Divergencies in the standard of qualification among the different patwári schools of the provinces have for some time attracted the attention of this Department. The Board have now sanctioned a set of revised rules, by which the six-monthly examination of patwáris will include printed papers set by the Director in Rules and Duties of Patwáris and by the Superintendent, Land Record Surveys, in Mensuration and Arithmetic. The examinations will be held simultaneously over the provinces, and the marks adjudged by the local examining committees will be reported to the Director, who will be able to compare the standard imposed in different districts. He will, if necessary, call for the candidates' papers and revise the marking or ask the district committees to reconsider it.

The same rules provide for improving the position of the patwáris' school teacher by raising his pay to Rs. 30 a month. They also enforce as one of his qualifications a practical knowledge of survey acquired by attendance with a cadastral survey party.

7. *Prospects of the patwári.*—The improvement of the patwári's qualifications cannot, in some districts at least, be effected without some amelioration of his position. In several of the Oudh districts that have recently come under survey, the pay of the patwáris has been found altogether insufficient for the work expected of them. In other Oudh districts the reorganization of circles had been under consideration for some years, and the existing scales of pay were felt to be inadequate. Draft rules therefore for rearranging the circles and grading the pay of patwáris in Oudh were submitted to the Board of Revenue during the year under report. In Bahraich, Gonda and Kheri, the revision of patwáris' circles has been postponed till the completion of survey operations in those districts. Meanwhile proposals to relieve the underpaid or overworked patwáris in the Kheri district, where the scale of pay is abnormally low, are being submitted to the Board of Revenue.

In the North-Western Provinces there have been no material changes in the cadre or pay of the patwári staff. The introduction of the final scale of revised pay and circles is still in progress in Muttra, Agra and Etah. In Muttra the period for its enforcement has been extended up to 1st April 1898, and a further extension of one year up to 1st July 1898 has been allowed in Etah; in Agra progress is slow and not altogether satisfactory. To maintain the new settlement records and maps in Garhwál, a further increase of four patwáris, three chainmen and three supervisor kanúngos has been sanctioned for a period of three years only. Survey operations having been finished in the Gurserai estate of the Jhánsi district, proposals for a revision of patwáris' circles have been received and are under consideration.

The promotion of specially capable and deserving patwáris to the post of supervisor kanúngo is sufficiently provided for by the existing rules. During the past year out of the 634 new appointments to kanúngoships or assistant kanúngoships reported to this office, 63 have been given to patwáris. No specific number of supervisors' posts is reserved, as in the Panjáb, for patwáris; and it is doubtful whether the standard of education among the patwáris in these provinces would justify such a measure. If a close connection is to be established between the kanúngo staff and the higher administrative service, admissions to the former must be jealously watched, and an undue prominence of the patwári element seems undesirable. This question, however, is a wide one and will be separately discussed.

8. *Training of kanúngos.*—At the annual divisional examination of kanúngos and candidates for kanúngoships conducted by the Director and Assistant Director

during the rainy season, 231 persons appeared for examination, of whom 82 passed in all subjects and 148 in part. A distinct difference was noticeable between the ntelligence of the candidates in different parts of the provinces. The Doab men made the most satisfactory appearance, and those from the Fyzabad Division absolutely the worst. Candidates for kanúngoships continue to be admitted to the Agricultural School at Cawnpore, on special nominations from their district officers, and receive separate instruction in the duties of a kanúngo. During the year under report, 12 candidates passed the kanúngo examination from the school. Mr. G. B. Scott, the Superintendent, Land Record Surveys, who examined the school candidates in surveying for the third time, remarks that they have improved in practical working, both in survey work on the ground and in area-estimating.

The survey training of kanúngos generally has now been put on a very efficient footing. All candidates for appointments are required to undergo a course of practical training with one of the cadastral survey parties, and to obtain a certificate from the officer in charge, before they are considered to have qualified for a kanúngoship. Of the 82 persons who passed our departmental examination in the rains, all but 19 had already been through a survey course; during the year 127 kanúngo candidates in all were passed as proficient by the survey officers.

9. *Prospects of the kanúngo staff.*—The number of temporary and permanent promotions obtained by kanúngos are noted below for the last four years:—

| | 1893-94. | 1894-95. | 1895-96. | 1896-97. |
|---|---|---|---|---|
| Temporary appointments as Naib Tahsíldárs ... | 12 | 20 | 23 | 35 |
| Permanent ditto ditto ... | 4 | 1 | 1 | 1 |
| Temporary appointments as Tahsíldárs ... | 4 | 2 | 2 | 0 |
| Miscellaneous appointments ... ... | 2 | 2 | 1 | 1 |

The increase in temporary appointments in the year under report is largely an accident, due to the drafting off of permanent Naib Tahsíldárs to famine relief duty. This being so, the prospects of the kanúngo staff cannot be said to have materially improved as yet. The nomination of seven kanúngos for Naib Tahsíldárships, it is true, was accepted by the Board, and promotion will probably come quicker in future. Meanwhile there are unmistakeable signs that the promise of more definite promotion in the executive line is attracting a considerable number of candidates of a better stamp into the kanúngo ranks. Very promising material is also being turned out by the Agricultural School at Cawnpore, the passed students of which are almost all willing and anxious to get kanúngo appointments. It is believed therefore that district officers have an opportunity of introducing fresh blood into their staff and improving the quality of supervision. But to what extent this will continue to be the case must largely depend on the run of promotions actually secured.

10. *Kanúngo Inspectors.*—These officials continue to work with reasonable efficiency. During the year they inspected the work of kanúngos and patwáris in 25 districts with the view of correcting errors of procedure and bringing defects to the notice of the district authorities. Under rules recently published, the Director has been allowed to nominate one of his Kanúngo Inspectors every third year for a Tahsildárship.

## CHAPTER III.

### Utilization of Land Records.

11. This chapter must be mainly confined to a brief outline of the progress in the preparation and systematic use of pargana books as the basis of "district analysis." Village registers and pargana books in the revised form, as also the pargana hand-books have been prepared in Muzaffarnagar, Bulandshahr, Saháranpur, Unao, Rae Bareli and Lucknow. In Jhánsi, Bara Banki, and Partábgarh, the mauza registers and pargana books only have been compiled, while in Gorakhpur, Basti, Bijnor, Budaun, Hardoi, Fyzabad, Sultanpur and Sitapur, the preparation of these records as well as of pargana hand-books is in progress. The hand-books are being written

in Bara Banki and Partábgarh : they will be taken up in Jhánsi as soon as the work in Basti and Gorakhpur (where the special establishment is at present employed) is over. Necessary steps have been taken for the preparation of the new registers and pargana hand-books by the Settlement Officers of Meerut, Lalitpur, Sháhjahánpur and Bahraich. In other districts the work will be taken up along with the settlement operations. The attendance of the district staff on relief works, the progress of assessment operations and the preparation of revised registers by the Settlement Officers have retarded the work throughout the Oudh districts. In Lucknow, Unao, Rae Bareli, Bara Banki and Partábgarh, the new pargana books will be brought into use this tour season, having been only recently received from the Settlement Department.

On the whole, there is reason to be satisfied with the part that is being played by the tahsíl registers in the work of "district analysis." If they are properly maintained and intelligently annotated, their value as a summary of the bulky statistics in our village papers can scarcely be over-estimated. The Collector of Bánda has testified to the assistance he derived from them in time of famine; and every district officer should regard them as a reservoir of information from which he or his successors can draw in any future revenue or climatic trouble that may attack the district. Much has been done to simplify the form of the registers and to systematise the information they provide; and it is believed that they are now, in their new form, thoroughly handy and manageable. It only rests with district officers to insist upon their intelligent treatment by every responsible member of the district staff.

12. It is unnecessary here to describe the use that has been made of the land records of these provinces in localising and estimating the distress that has recently visited us, or of the land record staff in organizing the measures for combating that distress. The employment of the establishment has been described by Government in its Resolution of the 23rd of November last and justifies the expectations of its utility entertained by the framers of the Famine Code.

13. In the Goverment of India Resolution prescribing the form of this report, it is desired that some indication be given of the use of the land record staff to supply information on agricultural questions under enquiry. Since the year closed certain district officers have been requested to allow selected members of the staff to assist in an inquiry into the sugar industry which this Department has taken up. But during the year itself no special information was called for other than such as directly appertains to the yearly statistics. The future employment of the kanúngo or patwári staff on special inquiries will have to be the subject of careful arrangement with the district officers under whom they work.

## CHAPTER IV.

### Scientific and National Enquiry under Imperial Control.

14. Of the eleven "Sciences or fields of investigation" discussed in the Fourth Resolution of the Government of India, the Department has been unable to do any special work for, or claim any special assistance from, the two sciences of Meteorology and Bacteriology. Our connection with the other nine branches of Scientific enquiry may be summarised as below.

15. **Geography.**—The only branch of survey work under the control of this Department is the Cadastral or Land Records Survey of certain districts of the provinces. Traverse surveys were conducted last year, under the direct orders of the Survey of India Department, in the districts of Bareilly and Sháhjahánpur (completed), Kheri and Pilibhít (to be completed next season), Gonda (1,100 square miles) and Bijnor (4 out of 15 parganas). For these tracts village plots on the scale of 16 inches to the mile were made over to this Department for the cadastral survey of interior details. The geographical aspect of the work done by the Land Records Survey is thus described by the Superintendent, Mr. G. B. Scott:—

"The cadastral survey of the Lalitpur Sub-division and the Gursarai and Kakarbai estates in district Jhánsi having been completed, the village plans have

now been made over to the Survey of India Department for compilation of district and standard maps. The survey of the Meerut district having been completed, the village maps of that district will be made over shortly to the Survey Department. The survey of Sháhjahánpur will be completed during the ensuing season, when the village plans will also be available for cartographical purposes.

"As under the present system all village plans are plotted from traverse data and on a uniform scale, the compilation from them of geographical maps on the standard scales can be accurately and quickly done; the one set of traverse data sufficing for all scales, and the scale of survey being in regular proportion to those used for standard maps. Of the Meerut district a topographical survey, based on traverse data, was made in 1885 on the scale of two inches to the mile. It will suffice here to enter new lines of railway, roads and canals recently made, as few other changes have occurred. The village plans of Lalitpur will allow of the completion of the maps of the Jhánsi district. The plans supply all details required except the contours of several small hill blocks, which will have to be taken up on the two-inch scale by a Topographical Surveyor. Of Sháhjahánpur there are at present no reliable district maps. The data of the old revenue survey were lost in 1857. Since then not only have railways and roads been made, but the rivers and streams have in many parts changed their courses considerably: old village sites have been deserted, and new ones have risen. The materials now supplied will meet all requirements.

"The village plans made at former settlements, by other agency than the Survey of India Department, though in some districts very accurate as to details, were not connected by any scientific data. The compilation of district or standard maps from them could only be done by 'building up' blocks round central villages by fitting the boundaries on one another and then combining the several blocks—a method necessarily accumulating and increasing error, even in a single district. In addition the scales of the maps were not uniform, nor in any direct proportion to one another or to the usual scales of standard maps. Thus several districts were surveyed on scales of 105, 99 and 88 yards to an inch—that is 16·75, 17·77 and 20 inches to the mile respectively. To reduce these accurately to the standard scales of 4", 2", 1", ½" and ¼" would be almost impossible, especially with no scientific data on which to base them. Although some of them, where the changes in field limits have not been numerous, and have been carefully recorded, might answer for the purposes of revision of settlement, they could hardly be used for cartographical purposes, even if a traverse was made connecting all trijunction platforms. Resurveys on a scientific basis and a uniform scale will be necessary if they are to be utilized for cartography and for connection of geographical maps."

16. **Geology.**—From a geological point of view the only assistance which is rendered to the Imperial Department of Revenue and Agriculture is in the shape of a return of the production of minerals in these provinces, submitted every year to the Reporter on Economic Products to the Government of India for utilization in his "Review of Mineral Production in India." For incorporation in his annual report, the Inspector of Mines, too, is furnished through the Director, Geological Survey of India, with yearly and half-yearly returns giving information regarding the mines which may have worked in these provinces during the period for which the return is drawn up. Coal mines were opened in the Mirzapur district in 1896, and work commenced in March, but soon stopped.

17. **Botany.**—In botanical matters the Department has the advantage of receiving assistance and advice, when required, from Mr. J. F. Duthie, Director, Botanical Department, Northern India. During the year under report he paid visits of inspection to the Usar Reserves at Chherat and Gursikran in the district of Aligarh and at Juhi in Cawnpore, and made suggestions as to the classes of plants likely to suit usar soils. He also paid a short visit to the garden attached to the Cawnpore Farm, and was shown over the various crops raised from the carrot seed imported from England. At our request he made a microscopic examination of the varieties of the

imported seed which had failed to produce a crop, and sent a note on the results of his examination to the Department. The only assistance asked by him from the Department referred to the supply of a small quantity of jait *(sesbania ægyptiaca)* seed to the Agristologist of the Department of Agriculture, United States of America. The seed was collected and sent.

The work done in botanical investigation by the garden at Saháranpur, which is under the control of the Department, is described in the next chapter.

18. **Economic Products.**—The Reporter on Economic Products to the Government of India asked this Department to collect 48 articles out of those enumerated in the programme of collections to be made for the Indian Museum at Calcutta and the Imperial Institute, London, during 1896-97. Of these 48 articles, 16 have already been supplied, 17 could not be got, and the rest are being procured. Some separate indents, about seven in number, received from the Reporter for Miscellaneous Articles and specimens, were also complied with during the year. Crops were grown specially at the Cawnpore Farm to supply the Reporter with dried flowers of cotton and linseed. Out of our grant of Rs. 500 for the expenses of work for the Reporter we spent Rs. 290 during the year.

19. **Veterinary Science.**—The report of the Superintendent of the Civil Veterinary Department, describing both the Imperial and the Provincial sections of his work, has already been submitted to, and reviewed by Government.

## A.—Horse-Breeding.

By the recent Resolution of the Government of India, I am required to describe in this report the progress made in Civil Veterinary work under the various heads detailed in G. G. O. No. $\frac{18}{54}$ of 25th May 1892.

i.—*Distribution of Imperial Stallions.*—Fifty-seven horse and 75 donkey stallions were at stud work in the provinces against 67 and 79 respectively last year. The cause of retrogression is being investigated. Zamíndárs continue to be particularly fond of Norfolk trotters and hackneys: but Arabs and thorough breds, both English and Australian, are gaining in popularity.

ii.—*Registration of Mares* and viii.—*Registration of Produce.*—This is effected, through the instrumentality of patwáris, in the 15 districts where horse-breeding operations are carried on under the control of the Civil Veterinary Department. The system of registration is by no means perfect as yet; but constant attention is given to its improvement. The patwáris can be trusted to maintain fairly complete lists of the mares in their circles: but their information as to height, class, pedigree and details of coverings is of comparatively little value. Precautions, however, have now been taken to secure that the record for branded mares shall be kept with special care and correctness.

iii.—*Selection and branding of mares.*—There are now 3,488 branded mares on the provincial register, being 88 more than last year. The selection is virtually entirely in the hands of the Superintendent, Civil Veterinary Department, who branded 412 new mares this year, of whom 114 were pedigreed. The districts of Bareilly, Saháranpur and Muttra gave the most promising fillies: but very few selections could be made in the districts (Bareilly excepted) east of the Ganges. Objections by zamíndárs to the brand are comparatively rare, though during the year they were raised without any very good reason in the Oudh district of Hardoi. The question of selecting and branding mares that have been served by provincial stallions is under consideration, and will be the subject of a special report to Government.

iv.—*Elimination of unfit animals from the register.*—Four hundred and eighty-four branded mares were removed from the register: of this number 251 had died and the others had been sold, transferred and stolen. The Superintendent refused the only two applications presented during the year to have branded mares certified as barren.

v.—*Inspection of stallions.*—Apart from the systematic inspection of stands by the Superintendent, a large number of isolated inspections were made by district officials. The Superintendent on his visit to each stable collects, as far as possible, and examines the mares that have attended the stallion located at it. There is no information of how far this was done by other visitors.

vi.—*The supply of district stallions.*—When the year closed the provincial establishment had 54 horse and 10 donkey stallions at stud work in the provinces against 48 and 9 respectively in the previous year. There were also 19 stallions at work belonging to Court of Wards' estates or private individuals, being one more than in the foregoing year. The growing popularity of Government stallions may be gauged in various ways. There were, for instance, 34 applications for stallions pending when the year closed; there were five provincial stallions maintained entirely at private expense, although the Department is ready to pay two-thirds of the costs and fees, had to be imposed to check the run on a number of horses, chiefly Arabs, that had exceeded their complement of fifty coverings in the year. The total number of coverings, according to our latest figures, was 2,460 from provincial stallions against 2,465 last year, and 160 from private stallions against 330 last year; but the latter set of figures is confessedly incomplete. The question of imposing fees for the services of provincial stallions or of branding the mares served and of refusing the use of stallions to unsuitable mares is under consideration. The mares served during the year were, on the whole good, useful animals, and the demand for stallions was greater than could be met in the present restricted state of funds. Mule-breeding makes slow but fairly satisfactory progress. The great want continues to be a suitable class of mule for ordnance purposes: and a scheme of selecting pony-mares specially for mule-breeding on a guarantee by Government to buy the produce at a fixed sum has been received by most district officers with favour, but is not yet worked out in detail.

vii.—*Elimination of inferior sires.*—Very little has yet been done in this direction, and I am not aware that any systematised action could yet be undertaken in these provinces. During the year 499 colts were gelt by salutris paid from Imperial funds, and 145 by Provincial Veterinary Assistants.

ix.—*Instruction in horse-breeding.*—The Depôt Farm at Babugarh continued to be worked with economy and success during the year; but it was not found practicable to hold any demonstration classes or meetings of zamíndárs.

## B.—Cattle-Breeding.

It was reported last year that there were 25 Government bulls maintained in various districts in these provinces. Of these, one bull at Sháhjahánpur died and one at Pilibhít broke his foreleg and had to be shot. A Hissar bull transferred last year from Etáwah to the Government Farm, Cawnpore, was tried at the farm, and having been found unserviceable for breeding purposes was converted into a cart bullock. There are now 22 Government bulls in 17 districts. Of the 22 bulls, 16 are of Hissar, three of Kanvaria, two of Kosi and one of Parehar breed. All these bulls are reported to be doing well except four bulls of the Hissar breed, which have become

unserviceable through old age. No bulls at the cost of the Government were supplied to any district during the year under report. Four Khairigarh, one Parehar and three Kosi bulls were, however, purchased through this Department. Five of these were supplied to the Director of Land Records and Agriculture, Assam; one to the Court of Wards' estates in Rae Bareli; one to the Ramsay Dairy Farm at Naini Tal; and one to the Superintendent of the Dairy at the Lunatic Asylum, Bareilly. Court of Wards' estates and several private landlords have also received advice from the Assistant Director, who has a special knowledge of this subject, as to the most suitable stamp of stud bulls for their particular localities.

C.—Investigation and Prevention of Horse and Cattle Disease.

The Civil Veterinary Department has now 17 Veterinary Assistants employed under its orders in the provinces. The number is altogether inadequate, but will be gradually increased as funds allow. Useful work meanwhile is being done in getting the villagers accustomed to the visits of the Veterinary Assistants, whom it is hoped they will in time be induced to consult and trust.

Several outbreaks of surra and one case of glanders were reported during the year. The Superintendent visited the principal dâk lines in the provinces, and arranged for the isolation of animals showing suspicious symptoms; but beyond this no general treatment of horse diseases could be attempted.

The statistics of cattle disease, though yet confessedly imperfect, are improving. It is one of the patwâri's prescribed duties in these provinces to report at once to the registrar kanúngo of his tahsíl the occurrence of cattle epidemics; and the district officer is expected to forward the information to the Superintendent of the Civil Veterinary Department, who provides, if possible, special assistance in the case of serious outbreaks. Reporting was very much better last year than in the preceding year: 37 districts returned altogether 75,017 cases of disease; and the information available, defective though it is, is far ahead of the machinery for treating the diseases reported. Rinderpest and foot-and-mouth disease were as usual most active, giving a reported mortality of 55·6 and 8·7 per cent. of attacks respectively. The Veterinary Assistants were employed in dealing with cattle disease in the districts where they were stationed, and eight of them were also sent on special duty to other districts for the same purpose. The only public veterinary dispensary in the province is the one attached to the Experimental Farm at Cawnpore, and an effort is being made to establish one at the Meerut Demonstration Farm; but there is no immediate prospect of any further development. At the suggestion of the Inspector-General, Civil Veterinary Department, I am also corresponding with certain district officers in these provinces as to the advisability of establishing veterinary dispensaries in their respective districts, and the result will be communicated to Government in due course.

20. **Agricultural Science.**—(*a*) *Chemistry.*—Assistance from the Agricultural Chemist to the Government of India was frequently sought for by the Department during the year. Dr. Leather paid visits to the three Usar Reserves and made suggestions for improving the condition of the waste land. At Gursikran he recommended the starting of an experiment with gypsum with a view to neutralising the salts injurious to vegetation. He analysed several samples of manures prescribed for the experiments started by him at Cawnpore on sugarcane and potatoes, as well as of the dung, urine and litter of animals kept at Cawnpore and Gursikran under different systems of housing and feeding. He inspected the Government Farm at Cawnpore and the Demonstration Farm in Meerut. During the cane-crushing season he stayed at the Cawnpore Farm to analyse the juice and supervise personally the making of *gur*. The reports of the Cawnpore Experimental Farm and the Meerut Demonstration Farm were reviewed by him. He also came to Cawnpore in April and examined the students of the Agricultural School in Agriculture and Agricultural Chemistry. The Kishengarh Darbár made a reference to this Department with regard to the water of the wells of a village in the State, which was

said to be "hard" and destructive to crops. A sample of the water was obtained and sent to Dr. Leather for analysis. He analysed the water and declared it quite unfit for irrigation; he also made some suggestions with a view to improving the condition of the land which had deteriorated in consequence of being watered by it.

(*b*) *Mechanical Inventions.*—Eight applications for permission to file specifications of inventions relating to agricultural machinery were received during the year from the Government of India for opinion. They were examined by the Assistant Director, who recorded and submitted to Government his opinion about the novelty and utility of each.

21. **Entomology.**—The Superintendent, Indian Museum, Calcutta, very kindly supplied apparatus and insecticides to be employed for destruction of certain insect pests to which spring crops, chiefly poppy, mustard and wheat, are liable. No such pests however made their appearance during the year, and the insecticides could not be tried.

22. **Statistics.**—The statistical work of the Department enters into so many fields and keeps so many different objects in view that a description of it must to some extent overlap the narrative in other parts of this report. The figures collected and compiled during the year may be thus classified:—

(1) *Statistics of traffic.*—The following traffic was registered during the year 1896-97:—

(*a*) Foreign traffic.

(*b*) Railborne traffic.

(*c*) Inland road traffic.

(*a*) The *Foreign traffic* of these provinces is carried on with the countries of Tibet and Nepál. The registering clerks, who are stationed on the chief routes crossing the frontier, furnished as usual a monthly return to this Department. A consolidated return for the province was then compiled and submitted to the Statistical Bureau of the Government of India for incorporation in their monthly "Accounts relating to the trade by land of British India with foreign countries." The statistics of trade for the year were reviewed in the Annual Report of the Foreign Traffic; the important variations are noted below:—

Compared with last year's figures, the imports from Tibet rose from 57,605 to 66,844 maunds in weight and from Rs. 5,16,332 to Rs. 6,76,002 in value; the improvement being mainly due to larger receipts of wool, salt and horns. The exports on the other hand, diminished from 69,626 to 53,320 maunds in weight and from Rs. 4,14,244 to Rs. 3,49,930 in value, chiefly owing to a weakened trade in grain and sugar. The decline in the export of grain was due to the abnormally high prices ruling in this part of the country, while the export of sugar last year was the highest on record, and a decrease during the succeeding year was natural.

Imports from Nepál declined largely from 19,87,967 to 12,38,393 maunds in weight and from Rs. 59,76,144 to Rs. 44,81,161 in value. The decrease took place almost entirely in the receipt of grain, the Nepál authorities having stopped its import into these provinces as soon as famine declared itself. Exports to Nepál at the same time diminished from 2,20,201 to 1,97,964 maunds in weight: but their value rose slightly from Rs. 31,86,826 to Rs. 31,93,002. The decline occurred in all the chief articles of export except cotton-goods and salt; and is the natural consequence of the slackness in the import trade.

(*b*) *Railborne traffic.*—Quarterly statements of this traffic were received from railway offices; and after having been compiled in this office, were published with a short prefatory note for the information of merchants and others interested in them. The year's figures have recently been reviewed in the Department's annual report on the Inland Trade of the province, and will be embodied by the Statistical

Bureau in their "Accounts of the Trade carried by rail and river in India." The striking variations in the figures were these:—

The weight of the total railborne traffic of 1896-97 amounted to 6,09,40,718 maunds as compared with 6,04,82,173 maunds in the year before; but the value thereof rose largely from Rs. 33,96,93,381 to Rs. 40,48,92,623. This great excess of 652 lakhs of rupees is due partly to the rise in the prices of the more important articles of trade in consequence of the famine and partly to "Treasure" (amounting in value to 366¾ lakhs of rupees) having been registered for the first time during the year under report. The import trade rose from 3,50,59,695 to 3,91,87,360 maunds owing to increased receipts of food grains in consequence of the famine. As the natural consequence of hard times, the decline which took place in the imports of cotton-goods last year was maintained in the year under review. The volume of the export trade, which was waning last year, further declined from 2,54,22,478 to 2,17,53,358 maunds. The exports of cotton, wheat, sugar, hides and skins all fell off largely; on the other hand, oilseeds, *ghi* and indigo were exported in larger quantities than in the preceding year.

(c) *Road traffic.*—The registration of road traffic is conducted on the lines indicated in the Government of India's Circular No. $\frac{18}{32-5}$, dated 9th July 1890; and statistics are collected partly in connection with projected railway lines and partly with a view to ascertain the trade and resources of the different parts of the province. The registration of the three years' traffic at the posts established in 1894 in the districts of Meerut, Bareilly, Bijnor, Budaun, Moradabad, Sháhjahánpur, Pilibhít and Naini Tal was completed on the 31st March 1897; and the staff was moved in April following to the Meerut Division. The statistics of road-traffic have also been reviewed in the Annual Report on the Inland Trade of the province. Like the railborne traffic, the road traffic too showed a large decrease in the import and export trade of the districts concerned.

The figures collected in this tract in 1894-95, the first year of registration, were utilized soon afterwards in a report on the prospects of local traffic along the proposed line of railway from Gházíabad to Moradabad with its branch from Gajraula to Chandausi. A more recent instance, in which the statistics of road traffic collected several years ago were utilized, occurred in the year under review, when a report was furnished to the Public Works Department at their request as to the necessity for the proposed light railway from Cawnpore to Hamírpur, its prospects of proving remunerative and its suitability or otherwise for construction by private enterprise.

(d) *Riverborne traffic.*—The waterborne traffic of these provinces was registered in 1879-80 on five rivers, the Gogra, Rápti, Gumti, Jumna and Ganges,—and on the Ganges and Agra Canals. Since then the trade with Bengal by the Gogra and Ganges rivers has been registered for intermittent years; but no attempt seems to have been made to permanently register the riverborne traffic of these provinces with Bengal. The question was, however, taken up during the year at the instance of the Director-General of Statistics; and proposals have been submitted to Government for establishing registration posts on the Ganges and Gogra both in the Ballia district and on the great Gandak in the district of Gorakhpur; these being the only considerable waterways between the North-Western Provinces and Bengal.

(2) *Agricultural Statistics.*—The compilation of these figures forms an important part of the statistical work of the department; but it has not hitherto been customary to notice it in our annual report. Detailed crop and area returns and statements of holdings, rental demand and collections are furnished to the Board of Revenue for use in their Revenue Administration Report of the province; and a detailed review of them forms a part of the Director's contribution to that report. Tables showing for each district the total acreage, classification of areas,

irrigation, stock and transfers of landed property, together with the return of tea cultivation received from the Himalayan districts of Dehra Dún, Almora, Naini Tal and Garhwál, are also furnished to the Statistical Bureau for incorporation in the "Agricultural Statistics of British India." A detailed review of the Agricultural Statistics for 1896-97 has already been submitted to the Board of Revenue and will appear in their Annual Administration Report. Some of the more interesting features of these returns are described below :—

The year was a year of famine and the extent to which the agricultural interests of the province suffered from this widespread calamity is fully exhibited by the returns of cultivation. The steady decline in the cultivated and cropped areas of the province, which commenced in 1894-95, reached its climax in 1896-97, when the cultivated area dropped by 2,139,984 acres or 7 per cent. and the cropped area by 3,229,698 acres or 8 per cent. as compared with the figures of 1895-96, which was also a dry year, and in Bundelkhand a year of severe scarcity. If comparison is made with the area of 1892-93, a year of normal prosperity, the defect in the cultivated area would vary from 20 to 50 per cent. in some of the worst districts. The irrigation returns are also instructive. In the wet years which immediately preceded 1895-96 the irrigated area of the province declined largely, and in 1894-95 it amounted to 6,002,679 acres only. In 1895-96 it rose to 8,533,160 acres, and in 1896-97 to 9,649,398 acres. The area irrigated from wells rose by 43 per cent. and that from canals by 35 per cent. Irrigation from tanks and other sources was reduced by half owing to scanty rainfall. Another striking feature of this return is the extension of irrigation to the *kharíf* crops to which artificial watering is, as a rule, sparingly applied.

(3) *Reports on crops*—Forecasts on indigo, cotton, *til*, wheat, linseed and oilseed crops were issued as usual during the year for the information of the commercial community in this country and in other parts of the world, and for utilization by the Statistical Bureau in the General Memoranda on forecast crops issued by them. The area statistics required for forecast reports are obtained from the crop returns filed by the patwáris ; while the condition of crops is judged from the reports received from selected zamíndárs on a system introduced several years ago. This system originally worked well, as the gentlemen who gave their services knew that these services were recognised by the district officers who nominated them ; but of late years the interest taken in the work has not been sustained ; and the number of reports received fell off to such an extent as to materially impair the value of the forecasts. Steps were therefore taken during the year to revise and extend the list in consultation with district officers. The amended list is, for the purpose of a permanent record, attached to this report as an Appendix (B). In order that the reporters may not cease taking interest in the work and may understand that their work for Government is recognized by their district officer, it is intended to bring to his notice the assistance which they may give to the Department. As regards indigo the assistance of indigo planters too is now obtained with a view to secure greater accuracy in the preparation of the forecast of this crop.

A monthly report on the agricultural prospects of the season and a half-yearly report on the *kharíf* and *rabi* harvests of 1896-97 were submitted to Government as usual and published in the Government Gazette. These reports had necessarily to be enlarged in a year of famine ; and full information as to the character of the rainfall, the prospects of the season, the estimated outturn of crops, the prices of food grains and the condition of the agricultural and labouring classes was laid before the Government and the public through the medium of these reports.

(4) *Crop experiments.*—Crop-cuttings were made in the *kharíf* of 1896 and *rabi* 1897, with a view to ascertain the average outturn per acre of all the principal crops grown in these provinces. The results of these experiments were not separately reviewed as in the previous years, the quinquennial return prescribed by the Government of India having fallen due in July 1897. In this return were embodied the results.

of the experiments made since 1894, when the system was introduced. An explanatory memorandum also accompanied the return. These papers have already been circulated separately, and it seems unnecessary to notice here the conclusions that were drawn from the results of the experiments made. The seasons in which they were made were distinctly unfavourable; and the average yield per acre of the principal crops arrived at from the results of the four years' experiments did not justify supersession or correction of the estimates of average outturn reported to Government in 1892. It has therefore been recommended that the determination of a new set of outturn standards be postponed till the next quinquennial report in 1902. Meanwhile the question of amending the crop-cutting rules in the light of the experience of their working gained during the last four years is under consideration in consultation with officers interested in the experiments. It is thus hoped that the system of collating the results of experiments will be improved.

Forty-eight measuring chains and 92 steel yards for weighing produce have already been supplied to districts up to date for use in making crop-cuttings; and additional instruments are supplied to districts indenting for them.

(5) *Prices and wages return.*—For each district of the provinces a return of prices current (retail) of food grains and salt was published periodically in the Government Gazette. The return was fortnightly till December 1896 when, with a view to watch the fluctuations in prices during the famine, the return was made a weekly one under the orders of the Local Government. A fortnightly return of wholesale prices of certain articles at certain markets of the province was also published in the Gazette. This return has taken the place of Table B (prices of produce) of the agricultural returns which was discontinued in June 1896. A half-yearly return showing the wages of skilled and unskilled labour was compiled from the returns received from districts and published in the Gazette. Copies of the prices and wages returns were regularly furnished to the Statistical Bureau for information and for ultimate incorporation in the volume known as "Prices and Wages in India." The Department also furnished to the Board of Revenue (to be appended to their Annual Revenue Administration Report) a statement showing the prices of labour which prevailed during the agricultural year ending 30th June 1897.

(6) *Financial and Commercial statistics.*—Another direction in which the Provincial Department lent its co-operation to the Imperial Department was the collection of statistics in respect of Cotton, Woollen, Paper and Jute Mills and other large industries existing in the province. These statistics are collected solely for Imperial purposes and are embodied in the "Financial and Commercial Statistics for British India."

Apart from the regular tabulations now described, the department is liable to be called on for special collections of figures relating to economic questions for the time being under the consideration of Government. Several sets of statistics, some of them accompanied by diagrams and charts, were in this way submitted last year to Government in the Scarcity Department.

23. **Forestry.**—The immediate connection of this department with forestry is extremely slight and may almost be said to be confined within the narrow limits of district roadside arboriculture. The arboricultural operations for the year have already been reported in detail. The chief feature of the control exercised by this department has been the issue, in the interests of economy, of a standard working plan for the next five years' operations. The plan has been adopted, with necessary modifications, by most districts. The only points outside arboriculture which have been dealt with by the department were the preparation of a scheme for afforesting poor land along canal banks, and the discussion of a proposal made to Government by Messrs. Cooper, Allen and Co., for the establishment of babul reserves on a large scale in the Etáwah district.

# CHAPTER V.

## SCIENTIFIC AND LOCAL ENQUIRY UNDER PROVINCIAL DIRECTION.

24. In this chapter it is proposed to discuss briefly the chief results of interest obtained during the year in the farm which is under the control of the Department (Section A): to indicate the extent to which experiments were carried out on estates under Government or private management (Section B); and to refer to the co-operation of native landowners by the agency of agricultural associations or otherwise in the labours of the Department (Section C). The particular agricultural defect which was specially investigated during the year is dealt with in Section D, where the work on our Usar reserves is described. And in conclusion a few of the miscellaneous subjects in connection with agricultural improvements which have been referred to in former reports are collected in Section E. Among these subjects it is believed that a place may fittingly be given to the progress of those public gardens which are maintained, for other than purely ornamental purposes, under the general control of this Department.

## SECTION A.—Government Farms.

25. The Government Farm at Cawnpore is, properly speaking, the only general experimental station under the Department in these provinces. There are farms on Government land which the Department controls at Juhi near Cawnpore and at Gursikran and Chherat near Aligarh. But, though they are utilised at times and on a limited scale for general experimental purposes, the *raison d'être* of these reserves is the effort to reclaim usar soil, and their results are therefore more suitably discussed in Section D of this chapter. The Cawnpore Farm comprises the following five distinct institutions, which are all under the general control of the Assistant Director. That officer has a residence at the farm, and is in direct charge of the Farm office.

(1) The farm proper, devoted almost entirely to experimental agriculture. The Superintendent, who is also Principal of the Agricultural School at Cawnpore, draws a separate supervision allowance, and is assisted by a Farm Bailiff and a staff of paid apprentices.

(2) A seed godown, where agricultural seeds are stored to meet indents received from various parts of India.

(3) A workshop where improved agricultural implements are manufactured, repaired and kept for sale and exhibition.

(4) A public garden, part of which is devoted to agricultural experiments and part to the cultivation of fruit trees and vegetables, a large number of grafts of fruit trees being sold every year. The last three institutions are managed by a special Superintendent.

(5) A small Veterinary Hospital, maintained chiefly for treatment of farm animals and of cattle belonging to cultivators in the neighbourhood of the farm. It is in charge of a qualified Salutri obtained from the Civil Veterinary Department, Babugarh. Horse and cattle-breeding are also carried on at the garden, where there is a certain amount of accommodation for bulls procured for estates and native landowners.

26. The work done at and in connection with the Farm may be described under five heads—

(i) *Experimental agriculture.*—(For full details under this head, reference may be made to the separate Farm Report submitted to Government and published.) In the permanent experiment to ascertain the effect of different manures on maize the highest outturns (2,813 lbs. and 2,021 lbs. of grain per acre) were given by the plots treated respectively with sheep-dung alone and sheep-dung combined with gypsum. The

next best outturns were yielded by cowdung and poudrette, showing as in previous years the marked beneficial effect of highly nitrogenous manures on the maize crop; other manures containing smaller quantities of nitrogen yielded comparatively low outturns. In the permanent manurial experiment with wheat the largest yields (3,219 lbs. and 2,952 lbs. of grain per acre) were given by plots manured respectively with poudrette and sheep-dung. Cowdung and mixture of sheep-dung with other manures also produced good outturns as in former years, pointing to the conclusion that nitrogen is the most valuable ingredient in manures needed for wheat. In the experiment to determine the effects of gypsum and bone-dust as compared with cowdung on the yield of indigo, bone-dust gave slightly better results than cowdung, and gypsum proved to be inferior to both in manurial effect. Gram manured with gypsum gave an outturn of 629 lbs. per acre as compared with 514 lbs. obtained from ground *kankar* (crude carbonate of lime). In the manurial experiment with sugarcane the best yields of gur were given by castor cake and cowdung. Among vegetable manures tried on wheat old indigo refuse gave the highest outturn. Green hemp ploughed in produced a larger yield of wheat than other green manures. The outturn of wheat from plots in which it was grown in alternation with leguminous crops shows that there was some advantage in following this rotation as compared with growing wheat without manure. In the permanent experiment with deep and shallow ploughing the yield of the plots ploughed with the improved ploughs was again greater than that of the plot prepared with the native plough, indicating the advantage of deep ploughing in the particular *dumat* soil on which the experiment was tried. Country varieties of cotton sown before the commencement of the monsoon rains did uniformly better than those sown after the rains had set in—a fact confirming the results obtained in previous years. The experiment with the American varieties of cotton described last year, which had for its object the determination of the economy of taking successive outturns of fibres and seed by leaving the crop on the ground after the first picking, was continued and two more pickings were done during the year. The quantity of produce was good, but the quality of the staple was inferior in colour and in other respects to that produced by an ordinary first year crop on the same plots. Canadian oats again gave high outturns of straw, and established their value as a particularly good winter crop for fodder purposes. Experiments with European carrot seed were made in connection with the efforts of Government to introduce carrots on a large scale as a supplementary food supply in time of famine. The result of these trials has been reported separately.

(ii) *Distribution of seed and implements.*—Here also the work of the year will be found in detail in the annual farm report: the following is only an epitome of our chief operations. In April last the Conservator of Forests, Berar, indented for a very considerable quantity of Sanwan (Panicum miliaceum and Panicum frumentaceum), Mandua (Eleusine coracana) and Kodon (Paspalum scrobiculatum) seeds for cultivation in the rains in the famine tracts of that province. The Department was able to collect and supply 3,762 lbs. Sanwan, 2,091 lbs. of Mandua and 62,342 lbs. of Kodon seed. Special arrangements were made to procure maize seed from Jaunpur for experimental cultivation in certain Oudh estates under the Court of Wards, and in all 7,018 lbs. of Jaunpur maize were distributed during the year against 87 lbs. in the past year. Gujrati Bajra (Pennisetum typhoideum),

which is superior to the indigenous variety, was procured from Nadiad in Bombay and distributed to the extent of 4,515 lbs., chiefly among the managers of Court of Wards' estates. Over 500 lbs. babul and over 200 lbs. of Ingadulcis seeds were collected aud distributed for sowing on poor lands, chiefly in the Family Domains of the Máháraja of Benares. Over 5,000 canes of the Matna variety were sent to the Tikari estate, Gaya, at the request of the Director, Land Records, Bengal. Fifty pounds of genuine white poppy seed were supplied to the Government of New South Wales under the orders of the Government of India, and 82 lbs of different varieties of paddy were sent to the Superintendent of the School of Agriculture, Colombo. Among improved implements, the demand for ploughs slackened owing to the prevailing scarcity, whereas that for the chain-pumps rose very considerably on account of the greater necessity for irrigation; 32 pumps having been sold during the year, 9 given on trial and 5 on hire. Of the pumps sold 3 were double chain pumps worked with cattle gear. Hitherto there was practically no sale for the double pumps owing to their high price (Rs. 200 to Rs. 260); and it is gratifying to see that they did not fail to attract the notice of landowners in a season in which they could be particularly useful.

A new form of improved plough has been invented at the farm workshops during the year. It combines all the good qualities desirable in a soil-inverting plough and costs only Rs. 4. It is a decided improvement upon the improved Buldeo plough which was favourably mentioned in the past few years' reports and deserves attention.

(iii) *Well-sinking.*—The Department keeps several sets of apparatus used for making trial borings, prior to sinking wells, in order to determine the nature and depth of the underground strata. The tools are worked by well-sinkers trained at the farm, whose services are available to landowners at the small salary of Rs. 12 per mensem, besides the railway freight of their tools. In former years the staff of well sinkers entertained by the Department consisted of 2 or 3 men; but owing to the increased demand for their services during the year under report, the number of well-sinkers was raised to 8. They were all busy throughout the year, 105 trial borings having been taken against 50 in the past year. In several cases masonry cylinders which had listed over to one side in the course of sinking were also put right by these men. The well-sinkers are paid by the Department for the short intervals during which they are not employed by private individuals. The wages thus paid by the Department amounted in all to Rs. 51-7-8, and new tools worth Rs. 1,166-10-8 were purchased during the year in order to meet the increased demand.

The zamíndárs are obviously becoming alive to the advantages of the boring operation, and the Court of Wards' estates generally have it carried out before a well is constructed. The assistance ordinarily given by the Department to zamíndárs in this direction is readily recognised and thankfully acknowledged by them.

(iv) *Agricultural Shows.*—The Department generally exhibits the produce of the Cawnpòre Farm and the improved implements made at the workshops in the various agricultural shows, where they can be most conveniently brought to the notice of agricultural classes. During the year under report only two such fairs were held; one at Bulandshahr and the other in Meerut. The Assistant Director visited both fairs and Mr. Moreland was also present at the former. Other agricultural shows which used to be held in former years were abandoned during the

year under report on account of the famine. As usual, the improved implements were worked before the public in competition with the native ones and excited considerable interest in both places. In the ploughing matches held at the shows the highest prizes were carried off by the Watts and the Buldeo ploughs, worked by trained ploughmen of the Cawnpore Farm, and prizes were also won by Buldeo, the head mechanic of the Cawnpore Farm workshop, for his waterlift, plough and other inventions. At both fairs the raw sugar (shakar) made by the Assistant Director by an improved method were adjudged superior to all other samples of raw sugar exhibited. The Assistant Director presided over the various judging committees in the Agricultural section at the two shows and collected the best specimens of the various grains exhibited in order to be kept in the show-room at the Cawnpore Farm. He also presided over a special committee appointed at Meerut to report on the merits of certain cane mills exhibited in Meerut. At Bulandshahr he made suggestions regarding improvement in the general management of the Agricultural sections of the show, which it is believed will be carried out at the next fair.

(v) *Cattle-breeding.*—The connection of the Department with attempts to improve the breed of cattle in the provinces centres at the Farm. An imprest is maintained for the purchase of bulls, assistance in procuring good breeding animals is given to all landowners and managers of estates who consult the Assistant Director, and as far as possible a small supply of selected bulls is kept in reserve at the Farm. It is impossible to meet the many indents that come in for bulls from Dairy Superintendents and estate managers. But we endeavour to give them advice as to the stamp of animal most suitable to their requirements and to indicate where such animals can be procured.

## SECTION B.—Private Farms.

27. **On Court of Wards' estates.**—The exigencies of the year kept all experimental work down to the lowest limit and hampered the success of what would ordinarily have been profitable undertakings; but more or less special attention was given to agricultural and stock-breeding in the estates managed by the Court of Wards in the following districts:—

| | | | |
|---|---|---|---|
| Meerut. | Budaun. | Mirzapur. | Gonda. |
| Aligarh. | Sháhjahánpur. | Gorakhpur. | Bahraich. |
| Etáwah. | Allahabad. | Rae Bareli. | Sultánpur. |
| Bareilly. | Jhánsi, | Sitapur. | Partábgarh. |
| Bijnor. | Gházipur. | Kheri. | Bara Banki. |

One of the most useful pieces of work done in most estates has been the introduction of improved varieties of the ordinary field staples. Jaunpur maize, Gujrati bajra, Muzaffarnagar wheat, Poona sugarcane, hill potatoes and English carrots have been employed in this way. In the Bajihera estate (Sitapur) tests of the comparative merits of local canes in regard to their yield of juice and *gur* elicited results which were described by Dr. Leather as most valuable. Improvements in agricultural implements during the year under report met with comparatively little attention, but since the year closed a much larger number of improved implements have been indented for by the larger estates from this Department. Large sums were spent in the construction of wells in Balrámpur and in the Bhadri estate (Partábgarh), and considerable sums elsewhere. The subject of fuel and fodder reserves continued to receive attention during the year in the Meerut and Sultánpur estates. Babul plantations were also established in two of the Bareilly estates, in the Haldaur estate (Bijnor), in the Mandari and Bhiraoti estates (Budaun), and in several other estates. In the Bajihera estate (Sitapur) an interesting attempt to

afforest ravine lands by enclosure and babul plantation has been begun, and in the Holapur and Khargapur estates in Allahabad experiments in reclaiming usár have been conducted. Stock-breeding is mentioned in the reports from 13 districts, 9 horse, 8 donkey and 28 bull stallions being maintained in Court of Wards' estates. The results of horse-breeding operations have been generally satisfactory; but there are general complaints against the donkey stallions, and mule-breeding makes slow progress.

In January 1897, the Board of Revenue had under consideration a note by the Agricultural Chemist to the Government of India on agricultural work which might be conducted on Court of Wards' estates in these provinces. The Director of this Department was asked for an opinion as to what action should be taken in some of the larger estates to carry out Dr. Leather's suggestions as to improved water-lifts and the introduction of the seed of new varieties of crops. Certain recommendations being submitted by Mr. Moreland, the Board of Revenue directed the Manager at Balrampur and the Special Managers of the Court of Wards' estates of Aligarh, Ghazipur, Lucknow, Sitapur, Kheri, Partábgarh and Bara Banki to try the various experiments suggested and to visit the Cawnpore Experimental Farm. The Managers visited the Farm towards the close of the year. They were shown the crop experiments and the collections of seed grain. All our improved implements were worked for their information; the method of storing seed, conserving manure and keeping bulls and stallions were also shown to them; and several agricultural questions of practical utility were discussed with them. Indents for implements, seed and bulls have since been received from most of their estates; and a distinct advance has been made in strengthening the connection between the Court of Wards' management and this Department.

28. **Managed by private individuals.**—(1) *The Meerut Demonstration Farm.*—This is the most important of all the private experimental farms in the provinces and has been under the management of the Collector of Meerut during the past three years. Mr. Wyer's personal interest has materially added to its usefulness, and he has laid out a systematic programme of operations in consultation with this Department and the Agricultural Chemist to the Government of India. Unfortunately for the Farm, Mr. Wyer left the district on promotion before the end of the year. A very useful work which the Farm has done during this period is the utilization for agricultural purposes of the city sewage passing down the *Ganda nala*. Experiments made at the Farm have proved beyond doubt the excellence of this manure, its effect being specially marked in the case of root crops. The cultivators in the neighbourhood of the Farm have now largely adopted its use.

Useful experiments have also been started with a view to determining the value of liquid manure as a fertilizer and the comparative effect of cattle dung preserved in the open air and under shade. Night soil is also drenched in cultivators' fields under an improved method copied from the Allahabad Grass Farm. The crop experiments are carried on on the same lines as at Cawnpore and generally with similar results. Among these the experiment to determine the economy of thick and thin sowings of wheat seed is particularly interesting. During the year under report different acreage allowances of seed varying from 52 to 9·2lbs. were allowed, and the highest outturn, *viz.* 1,760lbs. per acre, was obtained from the plot which received 82lbs. of seed. The result cannot, however, be regarded as conclusive. The Farm has also done good work in stock-breeding, its stud consisting of a Hissar bull, an Arab horse stallion, a donkey stallion, two he-goats and one ram. The Government has recently sanctioned the proposal made by this Department to place the Farm under the control of the District Board, the latter contributing Rs. 1,000 per annum towards its maintenance and the Department taking a share in its management. The orders will, as directed, be given effect to at the end of the current financial year. At present the Farm is managed by a trained apprentice of the Cawnpore Farm, whose pay is debited to this Department's budget. During the

year the Farm was visited once by Mr. Moreland, twice by Saiyid Muhammad Hadi and once by myself.

(2) *The Lyall Farm at Ujhauli*, measuring 38½ acres, is owned by Chaudhri Saiduddin Husain of Budaun, who takes a keen interest in horse-breeding and cultivation of varieties of crops.

There are 13 permanent employés attached to the Farm and the stable, and the annual cost of the establishment is reported to be Rs. 672. The Farm has a small seed store from which seeds are sold for cash and advanced as takavi to the cultivators. The total quantity of seed thus distributed during the year is reported to have been worth Rs. 811-12. The report received from the Farm shows that a moderate amount of success was gained in breeding from the stallions maintained at the Farm. Among the crop experiments tried none appear to be worthy of special notice.

(3) *The Jatau Farm.*—This farm belongs to Kuar Karan Singh, a landholder in the Agra district. It extends over an area of 70 acres and is worked with improved implements. Several varieties of wheat are grown at the Farm and the owner has been attempting to popularise the cultivation in his neighbourhood of the prolific Muzaffarnagar variety, which he grows extensively for seed purposes. Of various manures tried on this variety sheep-dung is reported to have given the largest yield, a result consistent with that obtained at Cawnpore.

## SECTION C.—Agricultural Associations.

29. There are two agricultural associations in touch with the Department, occasionally co-operating with it in introducing agricultural improvements: One is the Porter Association of Baraun in the Allahabad district, of which Rai Bahadur Thakur Mahabir Parshad Narain Singh is the Secretary; and the other is the Bijnor Agricultural Society, having for its Secretary Kunwar Sheo Nath Singh of Tajpur. The former distributed, with recognised success, about 47 maunds of Muzaffarnagar wheat in certain villages of the Karchhana tahsil. The Association continued its efforts towards extending the cultivation of sugarcane, and also introduced the cultivation of paunda cane imported from Lucknow with encouraging results. The Agricultural Society of Bijnor held two meetings during the year to dispose of some matters of routine business, but no work of any importance was performed. No meeting of the Provincial Agricultural Association, started by Mr. Smeaton in 1886, could be arranged for; but a very useful gathering, *viz.*, that of the Managers of Court of Wards' estates, was held at Cawnpore towards the end of the year, as already mentioned in paragraph 27. A trained apprentice has been supplied to the estates in Partábgarh, and he is now teaching the cultivators how to work the improved implements we have supplied. It is proposed to have an informal meeting of selected zamindárs specially interested in agriculture at Cawnpore towards the end of the present cold weather, with a view to explaining to them some of the new implements and improved methods of cultivation. Large and formal gatherings of the Provincial Association are apt to degenerate into talk and leave no practical results.

## SECTION D.—Special enquiry into agricultural defects.

30. In the Fifth Resolution of the series published in the *Gazette of India* for 20th March 1897, the exhaustive investigation of specific agricultural defects is prescribed as one of the future duties of this Department. The Local Government has been asked, at the instance of Mr. Baillie when Director, to decide the particular defect or defects which should first be made the subject of enquiry; and pending receipt of orders on the reference, no special programme was drawn up during the year under report. But for twenty years past the treatment of soil damaged by saline efflorescence or *reh* has been the object of special and continuous investigation in these provinces. With a view to examining this defect and discovering a remedy, three blocks of *reh*-infected land were taken up by Government at different times and put under the control of this

Department. In the following narrative of the working of these "Usar Reserves" during the year will be found a statement of investigations which it is believed will have most useful results. The narrative is from the pen of Saiyid Muhammad Hadi, the Assistant Director, in whose special charge are the reserves, and who has directed the experiments throughout with occasional advice from the Imperial experts in Botany and Agricultural Science.

(1) *The Juhi Usar.*—The Usar Reserve at Juhi, measuring 102 acres and situated at a distance of about five miles from the Cawnpore Government Farm, was acquired under the Land Acquisition Act in 1882 and fenced round with barbed wire in order to protect it from inroads of cattle. The soil was heavy and somewhat impregnated with alkaline salts more or less injurious to plant life. The experiments carried on at the Reserve have for their object the determination of the effect of enclosure on the condition of land and grass vegetation, and are also directed towards raising trees and crops yielding fuel and fodder. As a result of enclosure the salts have almost disappeared; the soil though still hard has greatly improved and is now fit for cultivation. When thoroughly broken and pulverised by tillage it produces ordinary grain and fodder crops. Mixing sand with the surface soil was found in the past year to bring about a marked improvement in its condition, the yield of wheat from the plot treated with sand having been very considerably higher than that from the ordinary plots not so treated. This experiment has been placed this year on a more systematic footing and the results are being carefully watched.

On properly tilled and manured land juar (Sorghum vulgare) grown for fodder thrived remarkably well, the plants growing up to a height of 12 feet and the yield of dry stalks being 70 maunds per acre. Mash (Phaseolus radiatus) sown in conjunction with the juar also yielded a good crop, but maize, melons and carrots suffered from accidents of season. The grass vegetation, which had suffered very seriously indeed from the effects of the drought of 1896, was greatly benefited by the rains of the year under report, though it did not recover its original vigour. The prevailing grasses at the reserve are still *sporabolus pallidus* and *chloris tetrastachya*, though they are being ousted by *dube* (Cynodon dactylon) and other superior grasses year after year. Grazing is restricted to a small area and a certain amount of standing grass is sold every year for cutting. On the limited area from which grass was cut for hay-making, the yield of hay was about sixteen maunds an acre. Great attention has been paid in the matter of sowing and planting trees by various methods during the past few years. So far the results of sowing babul (*Acacia arabica*) seed broadcast on flat ground in a seed bed such as is ordinarily prepared for cultivation of cereals, have been far from encouraging. The seed germinated well when there was sufficient rainfall and the land was properly manured: but the young plants, though they survived throughout the cold weather, dried up in the hot season. The reason for the failure of this method of cultivation seems to lie in the fact that in the hot weather the ground underneath becomes too hard to admit of penetration of the tender roots of the young plants. The sources of irrigation at the Reserve being limited, it is impossible to help the plants at this critical age.

This being the case, a plan was devised of laying fields out in ridges about 10 feet apart, 2 feet high and about 1½ feet wide, after having ploughed them up as deep as in the case mentioned before. Babul seed was sown with and without manure on the ridges. It germinated freely and the plants proved to be capable of standing the effects of the heat to a far greater extent than those raised on the flat ground. Experiments with dhak (Butea frondosa) are being continued, but the results are not yet conclusive.

As regards planting trees, the method which has been found to be most successful consists in (*a*) digging holes about 4 feet deep and 3 feet in circumference; (*b*) filling them in with good earth imported from cultivated fields outside or with earth dug out of the holes themselves, mixed in either case with one-sixth of its

weight of manure, and raising the *thalas* about one foot above the surrounding level; and (*c*) planting young seedlings about six months old or sowing seed in the *thalas*. One hundred and five trees of babul, dhak, shisham (Dalbergia sissu), ber (Zizyphus jujuba) and nim (Melia indica), which have been planted by this method during the year, are doing particularly well. The growth of babul and dhak plants in *thalas* only two feet deep, though they had every care bestowed on them during the past 2½ years, has been stunted owing obviously to the hard bed underneath. Nim has, however, done well uniformly in holes of varying depths (even when only one foot deep), and seems to be very well suited for this particular class of land. Shisham also thrives far better than either dhak or babul. Among the fruit trees guavas planted in previous years are progressing very satisfactorily. Of 252 altogether planted, 159 have survived. These require frequent waterings. Twenty-four mangoes out of 28 and 8 jamun trees planted during the past rains in 4 feet deep *thalas* are in good condition. These fruit trees are also being tried in *thalas* only 2 feet deep.

The tanning trees, *viz.*, *Terminalia chebula*, *Terminalia bellerica*, *phyllanthus emblica* and *Zizyphus Xylopyra*, planted in 1893, are making good progress. The date palms are in good condition, but their progress is remarkably slow. *Agave americana* planted last year as a hedge has been a success.

The total receipts of the Usar during the year amounted to Rs. 39-3-6, and the expenditure to Rs. 938-5-0.

(2) *The Gursikran Usar.*—The Usar Reserve at Gursikran extends over an area of 960 acres and was acquired in 1885. It consists of two kinds of land, *viz.*, (1) a stiff clay covered with gandar grass (Anthisteria prostrata), and (2) usar land of the worst type highly charged with alkaline salts. Attempts have been made to reclaim the former by deep tillage and manuring, and the latter by planting trees and prohibiting or restricting grazing in order to favour the growth of natural vegetation. The culturable area now amounts to 97 acres, of which 78 are held by tenants at an annual rental of Rs. 469-4-0 and 19 acres are under direct management. Most of the fields, however, yield only one, the rabi crop in the year, being usually under water during the rains owing to the overflow of a nala which passes through the reserve. The chief crops raised by the tenants are wheat, barley, peas and mustard; and with proper cultivation they all yield very fair outturns. The indigenous variety of wheat grown after indigo on ten acres of land broken during the past two years under direct management gave an outturn of 14½ maunds per acre in the year under report. Barley did fairly well, and potatoes were also grown with some success. Juár grown for fodder yielded an outturn of 67 maunds of green stalk per acre, but on comparatively poor soils the yield came down as low as 20 maunds.

During the year under report there was a marked improvement in the grass vegetation, which had suffered very seriously during the past year on account of scanty rainfall. An area of 70 acres was let to Mr. Keventer in the past year for grazing purposes, and although it was not used for that purpose all the year round and was not grazed at all during the year under report, yet it compares very unfavourably with the grass land on which grazing is entirely forbidden,—a fact furnishing good evidence of the injurious effects of grazing. Hay was made at the close of the year from an area of 19 acres, and the yield amounted to 15 maunds per acre. Two hundred and five maunds of hay were recently sold for Rs. 60-12-0, a price which has never been attained before. The native cultivator is, however, generally reluctant to buy the hay for his cattle when other fodder is available. The predominant grass at the reserve is *Sporabolus pallidus*, which is admittedly poor in nutritive properties. Better grasses, such as *dub* (Cynodon dactylon) and *gandhel* (Iseilema Wightii), are generally extending themselves and the *batt* grass (Diplachne fusca), which is very much relished by cattle, has been extensively planted during the year. This grass extends itself very rapidly where water has a chance of standing, and it also improves the quality of the soil.

The silage made from the typical usar grass is generally of inferior quality; but experiments made during the past year have shown that mixing it in equal proportions with chopped *Sorghum impi* or khurti (Cyamopsis psoralioides) prior to putting it in silos considerably improves the quality of the silage. The propagation of trees has been a subject of special experiments since 1894, and a systematic record of these has been kept. Speaking generally, attempts to grow babul by sowing the seed broadcast on usar land have failed except on patches, occasionally met with on the usar plain, of comparatively good land, not highly impregnated with *reh*. The same remark applies to dhak. Efforts to grow trees in holes (thalas) filled with good earth have been attended with encouraging results so far. In absolute usar land a hard bed or pan of *kankar* underlies the surface soil and seems to interfere materially with the growth of trees. Where babul and shisham trees were sown and planted in thalas dug four feet deep in order to break through the kankar bed and filled with earth imported from cultivated fields, their progress has been remarkably satisfactory, and a comparison between trees so grown and those raised in shallower thalas at once convinces the observer of the superiority of the former method of planting. Four hundred trees have been planted during the past rains by the method which has appeared to be so successful, and if these grow well the difficulty hitherto experienced may be considered as solved. Guavas planted in four feet deep thalas during the past two years are making very satisfactory progress and the plantation is being extended. Jhau (Tamarix gallica) trees grown along the side of the canal distributary and in damp places are in a flourishing condition, but farash (Tamarix articulata), which has been repeatedly tried, has failed to grow. Where the condition of usar land has slightly improved, the cultivation of jait has been fairly successful, but in land badly infected with *reh* the plants are withering up. The date palms are progressing slowly but steadily.

At the request of the Agricultural Chemist to the Government of India gypsum has been applied this year on a large scale to a number of plots of usar land with a view to reclaiming them, and has also been used in thalas prepared for planting trees. The experiment is based on the understanding that the gypsum will in the presence of water combine with the injurious salt carbonate of soda and convert it into sulphate of soda, which is less injurious. The results of the experiment are being watched with much interest.

The experiment started in the beginning of July 1895, at the request of Dr. Leather, to determine the weight of dung obtained from (*a*) a pair of bullocks fed on grass and straw only, and from (*b*) a pair to which 5 lbs. of oil cake per diem were given in addition, has been maintained. The dung and the litter in each case were removed daily and conserved separately in pits; the contents of the pits were weighed at the end of twelve months and the following results obtained:—

| | Pair (*a*). | Pair (*b*). |
|---|---|---|
| | m. s. ch. | m. s. ch. |
| Total weight of fresh dung ... ... ... ... | 153 11 12 | 122 39 12 |
| Total weight of the dung at the end of the year ... ... | 53 7 0 | 38 25 8 |
| Total weight of fresh litter applied ... ... ... | 49 0 0 | 43 24 0 |
| Total weight of litter at the end of the year when converted into manure. | 34 15 0 | 36 0 0 |

A chemical analysis of these manures was made by Dr. Leather, and it showed that both the dung and the litter of the animals getting the allowance of cake contained over 1 per cent. more of nitrogen than the dung and litter of the other pair. In the experiment reported last year, which had for its object the determination of the quantity of firewood required per family of cultivators, it was found that a

family consisting of 6 members (the cultivator, his wife, one son 14 years old, and three other children 8, 6 and 3 years of age), consumed 73 maunds of firewood; while another family consisting of 3 members (the cultivator, his wife and a daughter 4 years old) consumed 45mds. 7 seers. The total receipts and expenditure of the Reserve during the year amounted respectively to Rs. 1,559-13-2 and Rs. 2,884-13-9.

(3) *The Chherat Usar.*—The dairy farm and the usar reserve at Chherat were leased to Mr. Keventer, a Swedish dairy expert, for a term of 5 years, commencing from 1st November 1894, and no experiments are now carried on at the place by this Department. Mr. Keventer's butter business is flourishing, and he has to keep a large stock of buffaloes, for which the supply of grass which the reserve is capable of yielding is scarcely sufficient. He has therefore utilized all the area under grass for grazing, and the natural vegetation on the plain looks very poor at present in consequence. The reclaimed culturable land, however, maintains the improvement which took place in its condition by deep tillage and manuring before the usar was leased out. A very marked change is also noticeable in the soil of certain plots, originally quite bare, in consequence of deep cultivation and heavy applications of dung and liquid manure made by Mr. Keventer. The reclaimed area yields very fair crops of rice, and a portion of it is at present under cereals and fodder crops.

Broadcast sowing of babul, the cost of which was partly contributed by the Department, has been attended with as little success here as at other reserves; but a number of babul and shisham seedlings planted in deep thalas filled with good earth are growing satisfactorily. Dhak and jhau trees planted in former years have nearly all died out; and the progress of ficus trees appears now to be slow. Date palms, to which a plot of comparatively good land had been allotted at the reserve, are in remarkably good condition. Mr. Keventer has lately started pig and poultry rearing in addition to his other ventures. The proposal made by the Department to sell the dairy and the reserve to Mr. Keventer has been sanctioned by Government, and the sale will be effected in due course.

(4) *Amramau.*—The usar plot at Amramau, which was sold in 1892 after being reclaimed by deep tillage and manuring, has been kept under observation. The place has been entirely neglected since the death in the past year of one of the owners, and the land is now going to be sold by auction in liquidation of his debts. A few fields were sown with wheat during the year under report, but the results were not satisfactory on account of careless management. The land has been lying fallow since the last kharif; the plain looks dreary and the soil has begun to show signs of deterioration. This unfortunate relapse has its value as proving the need of constant care and attention in dealing with usar lands.

## SECTION E.—Government Gardens and Miscellaneous.

31. The Botanical Gardens at Saháranpur and the Horticultural Gardens at Lucknow are entirely under the control of this Department, each of them having as Superintendent a trained European gardener. The Muktasar orchard in Kumaun is under the control of the Commissioner of that Division; but its budget and annual report pass through this Department, which is also frequently consulted as to the working of the orchard. The Khusru gardens at Allahabad and the Taj gardens at Agra are under the local authorities: the Director is associated in their management, and is the channel for the submission of their annual reports to Government, but his connection with them is almost entirely consultative. The first three gardens carry on work of agricultural interest and importance; the last two are mainly ornamental in purpose.

*(a) Saháranpur Garden.*—The dryness of the year was hard on the garden, especially on its orchards. But vegetables did well, and the issue of fruit trees and grafts, seeds of vegetable and flowering annuals, and cuttings of ornamental shrubs was

larger even than in the preceding year. On the scientific side the garden continued to work for the Reporter on Economic Products and to supply the Medical Department of the Government of India with considerable quantities of drugs (chiefly Hyosciamus and Taraxacum) at the bare cost of production. Experiments were also conducted with food and fodder products and other articles of possible economic value. The sisal hemp was successfully naturalised, considerable quantities of rhea were grown, and varieties of sugarcane, formerly strange to Saháranpur, were introduced to the neighbouring zamindárs and much appreciated. The total expenditure for the garden (with its branch at Arnigadh near Mussoorie) amounted to Rs. 25,063-7-7, and the total direct and indirect income to Rs. 27,384-8-0.

(*b*) *Lucknow Garden.*—As at Saháranpur, the orchards and flower beds suffered from want of rain. Experiments with the Arabian date-palm and with varieties of Eucalyptus were continued. The former has again given unsatisfactory results; but the latter do fairly well. Egyptian cotton and canaigre have been tried for the first time in the garden, but the results are not yet quite determinate. The scheme of apprenticing and training gardeners was revised ; the period of training being fixed at 5 years. The total expenditure of the garden during the year was Rs. 16,697-13-1 against a credit account of Rs. 13,734-15-8, including the value of plants issued free of charge.

(*c*) *Muktesar Orchard, Kumaun.*—Experiments were made in grasses, English clover and sorghum, and were on the whole successful. The potato crop also proved an excellent one and receipts in consequence rose to Rs. 1,025 during the year. Suggestions for certain improvements at the nursery were offered by this Department. The expenditure during the year amounted to Rs. 2,566-11-6 and was very much the same as in the preceding year.

(*d*) *Khusru Garden, Allahabad, and* (*e*) *Taj Garden, Agra.*—No work of any special interest was carried out at these gardens during the year, and the Department was not specially consulted regarding them.

32. *Dairies.*—The Department has now no direct concern with dairying, which is rapidly attracting private enterprise. It gives all the assistance it can, however, to Mr. Keventer's venture at Chherat and receives frequent reports from him. His business expands every year, and he well deserves the success he has achieved. For his butter he has now regular customers over the whole of Upper India, and even in such distant stations as Dibrugarh and Shillong. He has been trying small experiments in cheese-making for some years, and in the monsoon of 1896 he manufactured over 7,000 lbs. on the Cheshire system. The result was good uniform cheese as regards the flavour, but it was not found possible to keep the cheese at a low enough temperature after ripening; the butter fat melted and the cheese became brittle and grainy. Mr. Keventer is not, however, disheartened and intends to continue the experiment, having arranged for storage room at Mussoorie.

The Bareilly Lunatic Asylum Dairy and similar institutions at various cantonments are understood to have done well, and the supply of pure butter and *ghi* throughout the provinces is now assured.

33. *Preservation of fruit and vegetables by evaporation.*—Reference was made in last year's report to experiments made at Saháranpur by Mr. Gollan with Ryder's Evaporator. A considerable quantity of fruit and vegetables have now been dried by the machine ; but Mr. Gollan considers he has yet to reduce the cost of drying before the products could be successfully put on the market. Samples of the produce have, since the year closed, been received at this office, and it is proposed to send them to a few leading mercantile firms for report. Experiments on a smaller scale were made by the Assistant Director at Cawnpore with a cheap German evaporator, which was well spoken of by Dr. Voelker in his paper on the fruit-drying industry of Germany, published in the 3rd issue of the Journal of the Royal Agricultural Society of England for 1896. The evaporator is a simple contrivance, suitable mainly

for household purposes and is provided with half-a-dozen wooden trays with bottom made of wire-gauze, over which the fruits are placed for drying, a charcoal fire being kept underneath. Fair success was obtained in drying guavas, plantains, ber, Kashmir apples, shakarkand, carrots and radishes. Fully ripe mangoes were not pleasant to the taste and did not keep more than a fortnight. The process of drying with the small evaporator is tedious. The trays require constant watching, and the heat has to be regulated with great care, in order to prevent the fruits from being overheated. Further trials will be made, however, as there is still much to be learned about the art.

34. *Lucknow Museum.*—The working of the Provincial Museum may be referred to here, although the museum collections are concerned with arts and sciences that are not under provincial direction. Eight-hundred and forty-six specimens were added to the various sections of the museum during the year. Coins, books, manuscripts, art and ethnological exhibits provided the most important additions. The number of visitors fell off as compared with that in the previous year; but it is pleasing to note that 843 *parda-nashin* ladies took advantage of the special arrangements made on one day every month for their admission.

35. The Government of India in Circular No. $\frac{17}{21-2}$, dated 22nd June 1896, expressed approval of certain suggestions made by the Lahore Art Conference of 1894 as to the desirability of establishing show-rooms at centres of local industries for the collection of typical specimens of a sufficiently important and artistic character. It was also suggested that sale depôts should be established at centres of art industries for the sale and encouragement of approved work. The district officers of important centres in the provinces were consulted on the subject, and the result was duly reported to Government. The Government, having regard to the difficulty of finding funds for the establishment of these show-rooms and of providing for their organization, supervision and management, decided that the operations at present should be confined to the establishment of a depôt attached to the museum at Lucknow at which duplicates of articles on exhibition in the museum shall be available for sale on cash payment. It is hoped that the experience derived from the establishment and management of such a depôt at the Lucknow Museum will enable Government to decide further whether the system can be extended to other places where no museum exists.

## CHAPTER VI.

### Agricultural Education.

36. The large and important questions raised in the Sixth Resolution of the Government of India are still, I understand, under the consideration of the Local Government. I do not propose therefore in this place to attempt a general criticism, such as paragraph 9 of the Eighth Resolution contemplates, of the educational system of the provinces in its attitude towards an agricultural career. The question was thoroughly discussed at the Lucknow Conference in March 1896, and I am not in a position to add any new information or suggestions. I am corresponding with the Director of Public Instruction regarding the scheme for introducing agricultural teaching into normal schools: and it is believed that Government would rather have matured proposals for this and other similar schemes put before it than be addressed on such subjects in a necessarily desultory manner in an annual report. The following remarks therefore refer only to matters within the special knowledge of the Department or regarding which the Department has taken special action.

**I.—Primary Education.**—The course of primary education in vernacular schools has been found sufficient to prepare boys for the special training in patwâri schools. How far it is in itself suitable training for boys who are to spend their lives in agricultural pursuits is one of the larger questions on which I do not at present venture an opinion. The working of patwâri schools has been described in another part of

this report. Their transfer to the control of the Educational Department was discussed during the year, but was negatived by the Board of Revenue: and except in three districts, the special training of patwâris is under the direct control of the district officer as local head of the Land Record staff. It is believed that the training thus provided is adequate, if not (as it sometimes was in the past) evaded by wholesale exemptions from the examination test that follows it. The weakest point of the schools in some districts is the instruction in survey, and on this subject a separate reference will shortly be made to the Board of Revenue. The training of kanúngos theoretically differs very little from that imparted to patwâris, except that the kanúngo is required to have passed the Middle Class examination. But in practice the Director's Departmental examination is made considerably stricter than that of the patwâri school: and the standard of survey knowledge expected from the kanúngo has been appreciably raised by the order that he must earn a certificate of efficiency from a survey officer. With all this there is reason to consider that the time has now come for raising the educational qualifications of the kanúngo. His work grows with the growing importance of the land records, the preparation of which is under his immediate supervision. The checking and collection of the agricultural facts and statistics for his circle are not now his only duties: he has to report them intelligently and to be able to give a discriminating opinion upon them if necessary. Moreover if the breach between the "peripatetic service and the administrative service" is to be "gradually narrowed and eventually closed," the proportion in the former of promoted patwâris exempted from the Middle Class examination test must be materially reduced.

**II.—Readers and Text-books.**—During the year the Assistant Director, with the aid of Saiyid Ali Husain, the second master of the Cawnpore Agricultural School, was engaged in a translation and adaptation of a "First Book of Agriculture by Messrs. Benson and Subba Rao." The work has been approved of by the Educational Department, and is now being finally revised and corrected for publication. Saiyid Ali Husain has also prepared in Urdu a small Agricultural Primer (Muallum-i-Ziraat) which has been approved by the Provincial Text-Book Committee as suitable for adoption in vernacular schools. He has also written a series of agricultural lessons for insertion in vernacular readers. It is not yet known what action has been taken by the Educational Department towards introducing the primer and the lessons.

**III.—Training Schools.**—The supply of teachers qualified to give useful instruction in agricultural subjects in vernacular schools is, as already noted, a question on which I am in correspondence with the Director of Public Instruction. Proposals will, it is understood, be eventually submitted to Government by that officer.

**IV.—Higher Education in Agriculture.**—An account of the Cawnpore Agricultural School sufficiently covers the work done by this Department towards providing advanced agricultural training for the provinces. The school, a detailed report on which was submitted to the Director of Public Instruction in last June, is attached to the Government Experimental Farm at Cawnpore. The Principal, Mr. P. V. Subbiah, is also Superintendent of the Farm, and is assisted by two masters. The course is a two years' one and the subjects of instruction are Agriculture (theory and practice), Physiography, Chemistry (theoretical and practical), Botany, Surveying (theory and practice); and duties of kanúngo (for candidates for kanúngoship). Provision is made for the teaching of about 30 pupils, the majority of whom are nominated by district officers; boarding-house accommodation exists for about 18 students: and eight scholarships of Rs. 5 a month each are given by Government. Most of the scholars are intelligent lads of the superior kanúngo class; but a certain number of independent students, the sons of landed proprietors, are obtained as pupils, and every effort is made to increase this class of student. On the working of the school during the year the Principal has prepared the following note, which I cannot do better than quote:—

"At the final examination of the school the examiners were, as in previous years, Dr. Leather for agriculture, general chemistry and agricultural chemistry,

and Mr. Scott for surveying. Botany was this year examined by the Assistant Director. Thirteen students appeared at the examination and 12 passed, 7 of whom were placed in the first division and the rest in the second division. Though the standard of the examination was somewhat raised, yet the percentage of passes and the remarks of the examiners were as favourable as in the previous years. For the optional subjects of the School Final examination of the Allahabad University 18 boys appeared from the school, of whom 16 passed in elementary physics and chemistry, and 14 in agriculture with surveying.

"The outdoor and practical training has been maintained and improved. The zeal and interest in plot-cultivation have in no way diminished. The 1st year students have, since the year closed, been sent to the Bareilly Survey party for practical survey training for two months, under the supervision of Mr. Johnson, Survey Officer. Arrangements are being made to utilise a kanúngo inspector for completing the practical training of the 2nd year students in this subject. The riding club, which is maintained at the students' private charge, has now two horses and a pony instead of the single horse last year; and the club is on the whole sufficiently well equipped now to meet the practising requirements of all the pupils. The lawn tennis club and the newspaper reading-room (also maintained by the students themselves) have been working equally well. The football ground is being levelled and extended. There are also clear signs to show that the out-door and practical habits developed during the school course assist the students in their after-life and make them better executive officials.

"During the year under report it was decided to raise the educational qualifications of candidates before admission to the Entrance or the School Final examination of an University. To judge from the number of applications for admission that have been received this year, the time had clearly arrived for making this very necessary change. In the new class, formed in July last, there are 16 students, of whom all but one have passed either of the examinations mentioned above. The single exception has passed the English Middle examination and has been deputed by the Panjáb Educational Department with a view to introducing agriculture in the normal schools there, after he completes his course. All the 15 from these provinces are for employment in the kanúngo or revenue service. The new class formed is decidedly better than the batches of the previous year in educational qualifications, and not inferior as regards landed connections and social status.

"The majority of the passed students have succeeded in securing suitable appointments in the Revenue Department and in the Court of Wards, and are on the whole doing well. Till now none of the passed students has been utilised for teaching agriculture in the High schools in connection with the School Final examination of the Allahabad University, started on the recommendations of the Technical Education Committee of 1891.

"For want of sufficient and suitable boarding accommodation, no action was taken in the matter of completing the general education of minors under the Court of Wards by a course in agriculture at Cawnpore. The question of extending the boarding-house is under contemplation, and when accommodation becomes available it will be possible to make this important reform in the education of the wards if the course is approved of by the Board."

**V.—Agricultural Journal.**—Cognate in a manner to the provision of agricultural education is the agency employed by the Department for the publication of useful agricultural information to intelligent zamíndárs. This is a monthly journal published in Urdu, known as the "*Mufid-ul-mazarain*," for which a nominal subscription of 14 annas a year (inclusive of postage) is charged from subscribers residing in the United Provinces and Re. 1-6-0 from residents of other parts of India. The paper contains twenty pages of printed matter, consisting chiefly of translations from the writings of the Agricultural Chemist to the Government of India or of the Assistant Director,

and of selections from standard works on agricultural sciences and from agricultural papers and bulletins received in the Department. The monthly circulation of the journal towards the close of the year was 268 copies as compared with 343 issued last year. The subscription of the journal is payable strictly in advance; a condition which is not very readily fulfilled by the subscribers; and this fact mainly accounts for the decrease. Steps have been taken to re-enlist the defaulting constituents and to procure fresh subscribers, and it is hoped the deficiency will soon be made up. The total subscriptions during the year amounted to Rs. 143-3-6, and the cost of publication came to Rs. 360. An attempt to popularise a Hindi edition of the journal failed in 1889 and again in 1896.

## CHAPTER VII.

### Publication of Agricultural Information.

37. There is comparatively little to record under this chapter. Paragraph 10 of the Eighth Resolution of the Government of India directs reference to be made to five points:—

(1) The extent to which information has been obtained from the district circle note books of the occurrence and cause of serious agricultural deterioration.

(2) The system maintained for ledgering useful facts and information from district and settlement reports, from the reports of the scientific departments or from similar sources of information and the general progress which has been made or the difficulties which are found in the ledger work.

(3) The publication, or measures, if any, taken for the preparation of a statistical atlas, or of any other special works designed either to illustrate the agricultural or economic conditions of the province or of any part of it, or to indicate the position and needs of any agricultural or commercial industry.

(4) The number of papers communicated by or through the agency of the Department to the *Agricultural Ledger*.

(5) The number of papers received from or communicated to other provincial Departments.

38. As regards the first and third points it may be sufficient to mention that a detailed note on agricultural deterioration in these provinces during 1896-97 has been submitted to the Board of Revenue for publication in their Administration Report. The information therein contained was derived from reports submitted by district officers as to the use made by them of, and the lessons drawn from, the pargana books which collect the statistics of the village records. In reviewing the last year's note on the subject, the Lieutenant-Governor expressed his opinion that it is not sufficient to epitomise in annual reports the account of the vicissitudes of districts submitted by district officers. Those accounts should be examined by the Director and defects in them rectified. The movements in the agricultural condition of each district should be carefully noted and the results compiled every five years, thus laying the foundation for a permanent manual of the circumstances of each district. Under the orders of the Board of Revenue instructions are being drawn up to secure the efficiency for the purposes indicated by Government of the reports furnished by district officers. Proposals will be submitted to the Board and suggestions made for enquiring into the specific agricultural defects already disclosed. Meanwhile the district reports will be carefully scrutinised during the remainder of the cold weather and such further evidence will be collected as may seem necessary for a record of last year's agricultural conditions.

39. The second point for notice is the system of "ledgering" maintained in this office. By next year it is hoped that the system will be in working order. Up to the present, although the information collected by this office has always been roughly catalogued and has always been easily traceable, there has been no expressed system of classifying it such as the Government of India now suggests. The advantages of that system cannot fail to be recognised, and the note which is promised on the subject from the Reporter on Economic Products is awaited with interest.

40. The fourth point for review concerns the *Agricultural Ledger*. The papers communicated to the *Ledger* during the year by or through the agency of the Department are enumerated, as desired by the Government of India, in an Appendix (C) to this report. Besides these a note on the experimental cultivation of European carrots at the Cawnpore Farm and one on the degree of success attained in the various districts of the United Provinces in the cultivation of these carrots, both suitable for publication in the *Ledger* series, were furnished to Government. Like the system of "ledgering," the plan of communicating special information to the Agricultural Departments in other provinces has not yet been developed. Our annual farm and departmental reports have hitherto contained brief statements of the most important points in our work, and copies of them and of forecasts of crops are sent to other Provincial Departments of Agriculture. Copies of similar publications issued by those Departments are received in return.

## CHAPTER VIII.

### FINAL.

41. In connection with their suggestion as to the amalgamation of the Departments of Land Records and Registration, the Government of India desire, in respect of this province, that the Director should be permitted to receive copies of reports, annual or other, from the Registration Department, with authority to submit thereon such suggestions and comments as may occur to him for the consideration of the higher revenue authorities; and that the action taken in course of the year should be noted in the annual report of the Land Records Department. The exact procedure which is to be adopted with a view to comply with the wishes of the Government of India is under the consideration of the Local Government: meanwhile no action was taken during the year under report in the direction above indicated.

42. In concluding this report I have to apologize for the disjointed nature of its composition and for the frequent interruption of the narrative by promises of future action. The Department has been fully employed during the year and has shared to some extent in the general pressure of work caused by the famine. But its operations have not yet settled into the new mould prescribed for them by the Government of India, and there are still many points of detail which remain to be decided before the scheme for the extended utilization of the Department can be put into full practice. This report therefore in a way marks a transition between the old order and the new. It omits the discussion of several branches of our work which, though important in themselves, are not directly connected with the programme of the Resolutions and will in future find no place in this report. At the same time it discloses the points at which the operations of the Department will have to be modified or pushed forward to bring them into line with the new programme; and on some of those points it is unable to do more than offer promises of future action.

43. It is customary to take this opportunity of commending to the notice of Government the services of non-gazetted officers of the Department who have done good work during the year. I have pleasure in testifying, as all my predecessors have done, to the efficient and highly capable manner in which my Personal Assistant, Munshi Saiyid Husain, has discharged his duties; his control of the office has been excellent and his assistance has been most valuable in guiding and checking the statistical work of the Department, heavy at all times and particularly so in a year of famine. Mr. P. V. Subbiah has managed the Agricultural School with success and exercised an intelligent supervision over the Experimental Farm. The head clerks of the Land Records and Agricultural Sections, Babu Prag Das and Munshi Mashuq Ali, B.A., have had hard work to do and have not spared themselves.

I may be allowed again to submit to the favourable notice of Government the energy and economy with which the year's programme of cadastral survey work has been carried out, amid considerable difficulties and generally on very modest pay, by the officers in charge of survey parties in these provinces.

I have the honor to be,

SIR,

Your most obedient servant,

J. S. MESTON,

*Director.*

# APPENDIX A.

*Statement showing the Receipts and Expenditure of the Department of Land Records and Agriculture, North-Western Provinces and Oudh, for the financial year* 1896-97.

| Heads of charges. | Budgeted allotment. | Actual expenditure. | Savings on budgeted expenditure. | Excess. | Receipts paid into treasury. | Budgeted receipts. | Remarks. |
|---|---|---|---|---|---|---|---|
| | Rs. | Rs. a. p. | Rs. a. p. | Rs. a. p. | Rs. a. p. | Rs. a. p. | |
| Gazetted officers' travelling allowance ... ... ... | 3,170 | 2,824 1 0 | 345 15 0 | ... | ... | ... | |
| Office establishment ... ... ... ... ... | 25,764 | 25,614 1 9 | 149 14 3 | ... | ... | ... | |
| Ministerial officers' travelling allowance ... ... ... | 1,450 | 1,413 0 3 | 36 15 9 | ... | ... | ... | |
| Kanúngo Inspectors' establishment ... ... ... | 5,460 | 5,418 10 8 | 41 5 4 | ... | ... | ... | |
| Ditto travelling allowance ... ... ... | 1,900 | 1,765 5 3 | 134 10 9 | ... | ... | ... | |
| Office contingencies ... ... ... ... | 6,490 | 6,105 5 7 | 384 10 5 | ... | ... | ... | |
| Traffic Registration charges ... ... ... ... | 22,200 | 21,427 10 2 | 772 5 10 | ... | ... | ... | |
| Experimental Farm establishment ... ... ... ... | 4,596 | 3,740 9 9 | 855 6 3 | ... | ... | ... | |
| Ditto contingencies ... ... ... ... | 9,326 | 9,324 15 5 | 1 0 7 | ... | 4,355 10 6 | 4,000 0 0 | |
| Ditto and workshop contingencies ... ... | 3,200 | 3,167 4 1 | 32 11 11 | ... | 2,924 10 0 | 2,843 0 0 | |
| Well experiments ... ... ... ... ... | 1,110 | 1,099 2 7 | 10 13 5 | ... | | | |
| Reclamation of waste lands ... ... ... ... | 3,500 | 3,495 12 4 | 4 3 8 | ... | *3,295 10 8 | 3,600 0 0 | *Includes Government Dairy dues and outstandings realized during the year. |
| Dairy experiment charges ... ... ... ... | ... | ... | ... | ... | ... | ... | |
| Agricultural shows ... ... ... ... ... | 300 | 257 5 6 | 42 10 6 | ... | ... | ... | |
| Breeding bull and stallion charges ... ... ... | 1,078 | 1,071 14 1 | 6 1 11 | ... | ... | ... | |
| Imperial Institute, London ... ... ... ... | 500 | 289 2 4 | 210 13 8 | ... | ... | ... | |
| Miscellaneous experiments ... ... ... ... | 1,036 | 1,020 0 0 | 16 0 0 | ... | ... | ... | |
| Agricultural School ... ... ... ... | 4,956 | 4,895 2 10 | 60 13 2 | ... | ... | ... | |
| Gházipur Stud Farm ... ... ... ... | ... | ... | ... | ... | 14,314 0 0 | 9,057 0 0 | |
| Miscellaneous receipts ... ... ... ... | ... | ... | ... | ... | 244 11 0 | 300 0 0 | |
| Total ... | 96,036 | 92,929 7 7 | 3,106 8 5 | ... | 25,134 10 2 | 19,800 0 0 | |

NOTE.—Certified that the receipts in this office were checked in the manner prescribed in G. O. No. 34, dated 5th October 1882.

J. S. MESTON,

*Director of Land Records and Agriculture, N.-W. P. and Oudh.*

# APPENDIX B.

*Revised list of landowners selected for reporting on crop forecasts.*

| District. | Name. | Address. |
|---|---|---|
| Dehra Dún ... | Chaudhri Shib Ram ... | Rais, Dunga. |
| | Babu Mahesh Dass ... ... | Manager, Annfield Grant, Western Dun. |
| | Pandit Mathura Pershad ... | Zamíndár, Raipur. |
| | Chaudhri Lal Singh ... | Rais, Rangarwala. |
| | Colonel Harrison ... ... | Markham Grant. |
| Saháranpur ... | Chaudhri Shib Sahai ... | Rais, Karenthi, pargana Saháranpur. |
| | Lala Gokul Chand ... ... | Rais, Ambehta. |
| | Chaudhri Muhammad Siddiq Khan, | Rais, Raipur. |
| | M. Muhammad Naim Khan ... | Rais, Kailashpur, pargana Haraura. |
| | Rao Khadim Husain ... | Rais, Garh, tahsíl Roorkee. |
| | Lala Munshi Lal ... ... | Rais, Nakur. |
| | Lala Gobind Saran ... ... | Rais, Rampur, tahsíl Deoband. |
| | Lala Harpat Rai ... ... | Rais, Deoband. |
| | Lala Harnam Singh ... ... | Ditto. |
| | Rao Ghasi Khan ... ... | Rais, Harowra, tahsíl Saháranpur. |
| | M. Muhammad Niaz-ullah ... | Supervisor Kánungo, tahsíl Roorkee. |
| Muzaffarnagar ... | Chaudhri Ganga Ram ... | Zamíndár, Barwala, pargana Baghra. |
| | B. Sher Singh and B. Badam Singh. | Rais, Basehra, pargana Purchhapar. |
| | B. Dewan Singh ... ... | Rais, Khai Kheri. |
| | Lala Sarup Lal Mahajan ... | Rais, Jhinjhana, pargana Jhinjhana. |
| | M. Imam Ali Khan ... | Rais, Garhi Mian Bhaijan, pargana Jhinjhana. |
| | M. Saiyid Saiyid Muhammad ... | Rais, Bidauli, pargana Bidauli. |
| | Lala Kapoor Chand ... ... | Rais, Shamli, pargana Shamli. |
| | M. Saiyid Asghar Ali Khan ... | Rais, Jansath, pargana Jansath. |
| | Lala Bihari Lal ... ... | Rais, Kaithura, pargana Bhuma Sambalhera. |
| | Chaudhri Darab Singh ... | Zamíndár, Alipur Antaria, paragana Burhana. |
| | M. Muhammad Rahmat Ilahi Khan, | Rais, Shahpur, pargana Shikarpur. |
| | Lala Kundan Lal ... ... | Rais, Shikarpur, pargana Shikarpur. |
| | Chaudhri Jwala Singh ... | Rais, Bidal, pargana Kandhla. |
| | Lala Pem Raj ... ... | Rais, Khatauli. |
| | Chaudhri Hira Singh ... | Rais, None Khera, tahsíl Jansath. |
| | Rai Nihal Chand Bahadur ... | Honorary Magistrate, Muzaffarnagar. |
| Meerut ... | Hafiz Hamid Husain Khan ... | Rais, Meerut. |
| | Lala Jainti Pershad, son of Rai Bahadur Munna Lal. | Ditto. |
| | Chaudhri Debi Singh, Rai Bahadur, | Rais, Assora. |
| | Lala Ram Saran Das ... | Rais, Hápur. |
| | Lala Hira Lal ... ... | Rais, Mowana. |
| | Mir Fateh Ali *alais* Allah Razi ... | Rais, Phalanda, tahsíl Mowana. |
| | Rao Khurshed Ali Khan ... | Vice-Chairman and zamíndár, Baghpat. |
| | Chaudhri Dharam Singh ... | Member, Municipal Board, Baraut. |
| | M. Amir Ali Khan ... | Vice-Chairman and zamíndár, Sardhana. |
| | Lala Kallu Mal ... ... | Zamíndár, Mirpura, Member Local Board, tahsil. Sardhana. |
| | M. Abdullah Khan ... ... | Rais, Gháziabad. |
| | Lala Badri Pershad, Member ... | Resident, Ghaziabad. |
| | Kunwar Jai Narain Singh ... | Rais, Dadri. |
| | Chaudhri Hardeo Singh ... | Rais, Morta. |
| | Chaudhri Kaliyan Singh ... | Rais, Phapoonda. |
| Bulandshahr ... | Kunwar Tara Singh ... | Rais, Jahangirabad, tahsíl Anúpshahr. |
| | Kunwar Masood Ali Khan ... | Rais, Danpur. |
| | Kunwar Abdulghafoor Khan ... | Rais, Dharampur. |
| | M. Abdul Aziz Khan ... | Rais, Bulandshahr. |
| | M. Shankar Sarup ... | Rais, Sikandrabad. |
| | Kunwar Kharak Singh ... | Rais, Bhatauna, tahsíl Bulandshahr. |
| | Kunwar Karan Singh ... | Rais, Sikri, tahsíl Khurja |
| | Chaudhri Khushhal Singh ... | Rais, Jewar, tahsíl Khurja. |
| | M. Muhammad Ismail Khan ... | Rais, Gesupur, tahsíl Sikandrabad. |
| Aligarh ... | M. Muhammad Rahm Ali Khan ... | Rais, Atrauli. |
| | Lala Basdeo Sahai ... | Rais, Sikandra Bao. |
| | Thakur Gobind Singh ... | Rais, Pisawa, tahsíl Khair. |
| | Resaldar Bharat Singh ... | Rais, Nagladagar, tahsíl Iglás. |
| | Nawab Muhammad Usuf Ali Khan, | Rais, Mendhu, tahsíl Hathras. |
| | Thakur Sujan Singh ... | Rais, Rajawal, tahsíl Iglás. |
| | Saiyid Aziz-ul Hasan ... | Rais, Jalali, tahsíl Aligarh. |
| | H. J. Smith, Esq. ... ... | Burla tahsíl, Atrauli, Manager, Court of Wards. |
| | M. Shadi Lal ... ... | Manager, Court of Wards, Burhagaon, tahsíl Atrauli. |
| | Raja Ghansham Singh ... | Rais, Mursan, tahsíl Háthras. |
| Muttra ... | Mir Muhammad Husain .. | Zamíndár of Lohara. |
| | Kunwar Etmad Ali Khan ... | Rais, Sadabad. |
| | B. Girwar Lal Dhusar ... | Zamindár, Qasába Sohar. |
| | Lala Gopal Pershad Dhusar ... | Rais, Sohar. |
| | B. Sri Ram ... ... | Zamíndár, Joora. |
| | Chaudhri Shariful Hasan ... | Rais, Mahaban. |
| | Bohra Gajadhar Singh ... | Zamíndár, Jagdispur.. |
| | Lala Kausal Kishore ... | Zamíndár, Kopa, pargana Sadabad. |
| | Lala Sita Ram ... ... | Ditto ditto. |
| | Lala Ram Kishun Das ... | Zamíndár, Sonkh, pargana Muttra. |

## APPENDIX B—(*continued*).

*Revised list of landowners selected for reporting on crop forecasts.*

| District. | Name. | Address. |
|---|---|---|
| Agra ... | Maharaja of Bhadawar ... | Rais, Bhadawar, pargana Pinahat. |
| | Thakurain Mahtab Kunar ... | Taluqdár, Kotla, pargana Firozabad. |
| | Thakur Tika Ram ... ... | Rais, Mehanwan, pargana Kheragarh. |
| | Sah Mohan Lal ... ... | Rais, Samra, pargana Itimadpur. |
| | Molvi Ali Ahmad Khan ... | Vakil, Adalat Dewani, Agra. |
| | Thakur Karan Singh ... | Rais, Godam, Firozabad. |
| | Kunwar Kanhai Singh ... | Member, Municipal Board. |
| Farukhabad ... | Lala Mangli Pershad ... ... | Rais, mauza Bhojpur, tahsíl Farukhabad. |
| | B. Ishuri Pershad ... ... | Ditto. |
| | Lala Durga Pershad, Rai Bahadur, | Rais, Farukhabad city. |
| | Lala Badri Narain ... ... | Rais, mauza Bahbalpur, tahsíl Chibramau. |
| | M. Fazal Husain ... ... | Rais, tashíl Kanauj. |
| | M. Ganga Pershad ... ... | Rais, mauza Narmau, tahsíl Kanauj. |
| | Pandit Tirbhawan Nath ... | Rais, mauza Tirmukha, tahsíl Tirwa. |
| | Lala Pearey Lal ... ... | Rais, mauza Saurikh, tahsíl Tirwa. |
| | Kunwar Kalyan Singh ... | Rais, mauza Khairnagar, tahsíl Tirwa. |
| | B. Shib Dayal ... ... | Rais, tahsíl Aligarh. |
| | B. Bankey Singh ... ... | Rais, mauza Karanpur, tahsíl Aligarh. |
| | B. Lal Behari ... ... | Rais, mauza Dahlia, tahsíl Aligarh. |
| Mainpuri ... | Thakur Umrao Singh ... | Rais, Rukhawali, Civil Lines, Agra. |
| | M. Muhammad Abdul Rahman Khan. | Rais, Padham, pargana Mustafabad. |
| | Thakur Laik Singh ... ... | Taluqdár, Lahwa, pargana Shikohabad. |
| | Lala Phaldari Lal ... ... | Rais, Karhal. |
| | Lala Sri Narain ... ... | Rais, Madan Mau, pargana Shikohabad. |
| | Thakur Debi Singh Rathoor ... | Rais, Budhawali, Post-office Korauli. |
| | Kunwar Jadnath Singh ... | Zamíndár, Narainpur, pargana Bhongaon. |
| | Kunwar Khushal Singh ... | Zamíndár, Pandri, pargana Bhongaon. |
| | B. Ganesh Ram ... ... | Bohra and zamíndár, Karhal. |
| | B. Net Ram ... ... | Bohra and zamíndár, Deoli, pargana Barnahal. |
| | Kunwar Dammar Singh ... | Zamíndár, Bhongaon, tahsíl Mustafabad. |
| | Thakur Pancham Singh ... | Zamíndár, Milaoli, tahsíl Mustafabad. |
| | B. Ram Lal ... ... | Sazawal, Court of Wards' estate, Lakhora, tahsil Mainpuri. |
| | B. Brij Mukat ... ... | Sazawal, Court of Wards' estate, Eka, tahsíl Mustafabad. |
| | Chaudhri Sarnam Singh ... | Zamíndár, Barnahal, tahsíl Shikohabad. |
| Etáwah ... | Lala Kali Charan ... ... | Zamíndár, Ekdil. |
| | Chaudhri Parsotam Singh ... | Zamíndár, Mehdipur, pargana Bharthana, |
| | Kunwar Nawab Singh ... | Rais, Yakubpur, pargana Bidhuna. |
| | Tewari Kali Shankar... ... | Zamíndár, Kudarkote. |
| | B. Raot Jit Singh ... ... | Rais, Kakhatu, pargana Auraiya. |
| | B. Madan Mohan Lal ... | Honorary Magistrate, Etáwah. |
| | Pathak Sheo Sahai ... ... | Ditto. |
| | B. Sheo Lal ... ... | Rais, Malhausi, pargana Bidhuna. |
| | Chaudhri Darshan Singh ... | Zamíndár, Auraiya. |
| | Tewari Gandharp Singh ... | Zamíndár, Hardoi, pargana Etáwah. |
| Etah ... | Rae Oudh Narain ... ... | Rais, Sakit, tahsíl Etah. |
| | Syed Alai Barkat ... ... | Municipal Secretary, resident of Marehra. |
| | Kunwar Raghubir Singh ... | Rais, Bilram, tahsíl Kásganj. |
| | M. Shanker Sahai ... ... | Rais, Aliganj. |
| | Chaudhri Gulab Singh ... | Rais, Rupadhani, tahsíl Aliganj. |
| | Raja Balwant Singh, C.S.I. ... | Raja, Awagarh, tahsíl Jalesar. |
| Bareilly ... | Rao Bahadur Thakur Lakhan Singh. | Rais, Budhauli, pargana Faridpur. |
| | M. Muhammad Nabi Bakhsh ... | Zamíndár, Mundia, tahsíl Baheri. |
| | Thakur Baldeo Singh ... | Zamíndár, Oudh, tahsíl Mirganj. |
| | M. Wazir Khan ... | Rais, Richa, tahsíl Baheri. |
| | Kunwar Ishri Singh ... ... | Ilaqadár, Lailoor, tahsíl Aonla. |
| | Pandit Banke Lal ... ... | Rais, Nerkhera, tahsíl Mirganj. |
| | Thakur Ranjit Singh ... | Zamíndár, Oudh, tahsíl Mirganj. |
| | B. Puran Singh ... ... | Zamíndár, Kashinathpur, tahsíl Mirganj. |
| | M. Siraj Ahmad ... ... | Zamíndár, Khatana, tahsíl Nawabganj. |
| | Sheikh Inam Ullah ... ... | Zamíndár, Hardu, tahsíl Nawabganj. |
| | M. Hidayat Ullah Khan ... | Rais, Shahgarh, tahsíl Baheri. |
| | B. Balkishun Sahai ... ... | Zamíndár, Qasba Richa. |
| | Pandit Jamna Din Misr ... | Rais, Faridpur. |
| | B. Sheo Sahai Agarwal ... | Rais, Fatehganj East. |
| | Thakur Roshan Singh ... | Zamíndár, Atarchendi, tahsíl Aonla. |
| | M. Muhammad Shams-uddin Khan. | Zamíndár, Jangbazpur, tahsíl Aonla. |
| | Hakim Wajid Ali Khan ... | Zamindar and Rais, Qasba Aonla. |
| | M. Bheem Singh ... ... | Rais, Bareilly, mohalla Killa. |
| | M. Khudayar Khan ... ... | Rais, old city Bareilly. |
| | B. Mohan Lal ... ... | Rais, Bareilly, mohalla Biharipur. |
| | B. Mitban Lal ... ... | Special Manager, Court of Wards. |
| | M. Abdul Majid ... ... | Member, Board Baheri. |

## APPENDIX B—(*continued*).

*Revised list of landowners selected for reporting on crop forecasts.*

| District. | Name. | Address. |
|---|---|---|
| Bijnor | B. Sri Ram and Kali Rai ... | Rais, Mandawar, tahsíl Bijnor. |
| | Kunwar Harbans Singh ... | Rais, Haldaur, tahsíl Bijnor. |
| | Chaudhri Budh Singh ... | Rais, Siao, near Chandpur, tahsíl Bijnor. |
| | Mir Al-i-Ali ... ... | Rais, Nagina. |
| | Sheikh Talib Husain... ... | Ditto. |
| | Rai Lakhan Singh, son of Rai Kundan Singh. | Rais, Rehar, tahsíl Nagina. |
| | Chaudhri Basant Singh Rai Bahadur. | Rais, Seohara, tahsíl Dhampur. |
| | Chaudhri Mahtab Singh ... | Rais, Nehtor, tahsíl Dhampur. |
| | Raja Shiam Singh ... ... | Rais, Tajpur, tahsíl Dhampur. |
| | Chaudhri Amir Husain ... | Rais, Sahispur, tahsíl Dhampur. |
| | Mufti Ibrahim Husain ... | Rais, Kiratpur, tahsíl Najibabad. |
| | B. Baldeo Sahai ... ... | Rais, Nangal, tahsíl Najibabad. |
| | Manager, Court of Wards ... | Bijnor district. |
| Budaun | Sheikh Mumtaz Ud-din ... | Rais, Shekupura |
| | Khan Bahadur Muhammad Hamid Bakhsh. | Rais, Budaun. |
| | Sheikh Shafi Ud-din ... ... | Member, District Board, tahsíl Bisauli. |
| | Lala Banarsi Dass ... ... | Ditto. |
| | Pandit Jai Jai Ram ... ... | Rais, tahsíl Dataganj. |
| | Thakur Bhaga Singh... ... | Rais, Mauza Sabalpur, tahsíl Dataganj. |
| | M. Ibn Husain ... ... | Rais, tahsíl Sahaswan. |
| | Thakur Umrao Singh ... | Ditto. |
| | Chaudhri Chunnu Singh ... | Rais, Bhirooti, tahsíl Gannaur. |
| | Chaudhri Majid Ali ... ... | Rais, Gannaur. |
| | Sazawal ... ... ... | Bhirooti estate. |
| | Ditto ... ... ... | Mundari estate. |
| Moradabad | Pandit Har Sahai Pathak ... | Rais, Moradabad. |
| | Mirza Asfandiar Beg... ... | Ditto. |
| | M. Saiyid Muhammad Ali Khan... | Rais, Mahmoodpur, pargana Bilari. |
| | Rai Ganga Sahai ... ... | Rais, Sahanspur, pargana Bilari. |
| | M. Muhammad Ashiq Husain Khan, | Zamíndár, Sambhal. |
| | Lala Shiam Sunder Lal ... | Honorary Magistrrte, Sambhal. |
| | Thakur Ishri Singh ... ... | Rais, Faridnagar, pargana Thakurdwara. |
| | Sahu Ram Ratan ... ... | Rais, Thakurdwara. |
| | Chaudhri Dhian Singh, Rai Bahadur. | Rais, Kanth, pargana Amroha. |
| | M. Saiyid Faiyaz Husain ... | Rais, Amroha. |
| | Saiyid Mazaher Husain ... | Zamíndár, Ujhari, pargana Hasanpur. |
| | Lala Kishun Lal ... ... | Zamíndár, Said Nagli. |
| | Mahant Pirbhu Ban ... ... | Rais, Salaimpur. |
| Sháhjahánpur | Thakur Padam Singh ... | Rais, tahsíl Sháhjahánpur. |
| | Thakur Puran Singh... ... | Ditto. |
| | Raja Narain Singh ... ... | Rais, tahsíl Jalalabad. |
| | Thakur Ahlad Singh ... ... | Ditto. |
| | M. Saiyid Ali Ahmad, B.A. ... | Zamíndár. Tilhar. |
| | M. Zakir Ali ... ... | Rais, tahsíl Tilhar. |
| | Pandit Ajodhia Pershad .. | Honorary Assistant Director, Indalpur, tahsil Pawayan. |
| | Dewan Sardar Singh ... ... | Rais, Pawayan. |
| Pilibhít | Lala Debi Pershad ... ... | Rais and Honorary Magistrate, Pilibhít. |
| | M. Izzat Yar Khan ... ... | Rais and zamíndár, Jahanabad, tahsíl Pilibhít. |
| | B. Umrao Singh ... ... | Rais and zamíndár, Dewria, tahsíl Bisalpur. |
| | Lala Mangal Sen ... ... | Rais and zamíndár, Bisalpur. |
| | B. Darshan Singh ... ... | Rais and zamíndár, Madho Tanda, tahsíl Puranpur. |
| | B. Sukh Sagar Lal ... ... | Manager Court of Wards, city Pilibhít. |
| Cawnpore | B. Durga Pershad ... ... | Rais, Dadkha, pargana Bilhaur. |
| | B. Tulsi Singh ... ... | Rais, Rasulabad. |
| | Kunwar Tek Singh ... ... | Rais, Chandora, pargana Akbarpur. |
| | M. Ghulam Husain ... ... | Rais, Pureni, pargana Bhognipur. |
| | Pandit Sheo Rup Dube ... | Rais, Pokhraen, pargana Bhognipur. |
| | M. Dargahi Lal, Rai Bahadur ... | Rais, Nawabganj. |
| | B. Sidhgopal Misr ... ... | Rais, Cawnpore city new road. |
| | B. Durga Pershad ... ... | Rais, Seondhi Lalaipur, pargana Ghatampur. |
| | B. Bandi Pershad ... ... | Rais, Shiurajpur. |
| | B. Uma Shankar ... ... | Compensation clerk with Special Deputy Collector Cawnpore. |
| | B. Fateh Bahadur ... ... | Ditto. |
| Fatehpur | B Man Singh ... ... | Rais, Kotia. |
| | M. Mohammad Ali Khan ... | Rais, Behta. |
| | Sheikh Ahmad Bakhsh, Khan Bahadur. | Rais, Badan Mau. |
| | Lala Ishwar Sahai ... ... | Rais, Fatehpur. |
| | Nawab Ali Husain Khan ... | Ditto. |
| | Saiyid Zainul Abdin ... ... | Rais, Kora. |
| | Rao Iqbal Bahadur ... ... | Rais, Jahanabad. |
| | Raja Narpat Singh ... ... | Rais, Asother. |
| | B. Bhagwan Parshad... ... | Rais, Purwai. |
| | Saiyid Zahur Ahmad ... ... | Rais, Mandwa. |
| | Pandit Suraj Pershad... ... | Rais, Asni. |

## APPENDIX B—(*continued*).

*Revised list of landowners selected for reporting on crop forecasts.*

| District. | Name. | Address. |
|---|---|---|
| Bánda ... | Chaudhri Mahesri Pershad ... | Rais, Bánda. |
| | Pandit Madho Pershad Tewari ... | Rais, Ichhauli. |
| | Sheikh Imdad Ali ... | Rais, Chilla. |
| | Mir Imdad Husain ... | Rais, Augasi. |
| | B. Sripal Singh ... | Rais, Panah. |
| | B. Ram Sahai ... | Rais, Ambhapurwa. |
| | B. Chanda Singh ... | Rais, Pachhahan. |
| | B. Ajodhya Pershad ... | Rais, Mau. |
| | B. Ram Adhin Gir ... | Rais, Rajapur. |
| | B. Mathura Pershad ... | Rais, Kalinjar. |
| | Pandit Tulshi Ram ... | Zamíndár, Sambandhi Kalan, pargana Pailani. |
| | Lala Thakur Pershad ... | Taluqdar, Basenda, pargana, Bidausa. |
| | Pandit Chandi Din Dube ... | Honorary Magistrate, Bánda. |
| | Pandt Thakur Din Pathak, Rai Bahadur. | Rais, Naraini, pargana, Girwan. |
| | M. Saiyid Muhammad Bakar Husain | Rais, Karwi, Honorary Magistrate Bánda. |
| Hamírpur ... | M. Saiyid Muhammad Ismail ... | Member, Local Board, Hamírpur. |
| | Pandit Gopal Dás Tewari ... | Zamíndár, Sesaular, tahsíl Maudaha. |
| | B. Thakur Das Gautam ... | Mahajan, Kulpahar. |
| | Pandit Gobind Rao ... | Zamíndár, Bijainagar, tahsíl Mahoba. |
| | Kunwar Partab Singh ... | Zamíndár, Kachhauchha, pargana Rath. |
| | Mirza Inaet Husain, Member, District Board. | Rais, mauza Kalla, tahsíl Hamírpur. |
| | B Bhagwat Pershed Dube ... | Zamíndár, mauza Banki, tahsíl Hamírpur. |
| | Pandit Madho Pershad Gurdeo ... | Rais, mauza Gahrauli, tahsíl Maudaha. |
| | Pandit Baldeo Pershad, Member, District Board. | Rais, mauza Imilia, tahsíl Maudaha. |
| | Dewan Balbhadar Singh ... | Rais, mauza Majhgawan, tahsíl Rath. |
| | Pandit Bhaya Lal Misr ... | Rais, mauza Italia, tahsíl Rath. |
| | Pandit Mul Chand Panda, Member, District Board. | Rais, mauza Jalalapur, tahsíl Rath. |
| | Thakur Sobha Singh ... | Rais, Kulpahar Khas. |
| Allahabad ... | Chaudhri Jamal Uddin ... | Zamíndár, Bambhrauli, pargana, Chail. |
| | Saiyid Musahib Ali ... | Zamíndár, Asrawi Kalan, pargana Chail. |
| | Lala Kashi Pershad ... | Zamíndár, Faridganj, pargana Kara. |
| | Pandey Sheo Sahai ... | Rais, Udhenbuzurg, pargana Kara. |
| | Saiyid Ghulam Haidar ... | Zamíndár, Manjhanpur Khas. |
| | B. Sheo Dayal Singh ... | Zamíndár, Unnoo, pargana Atharban. |
| | Raja Lal Tribhawan Pat Din Shah Singh. | Rais, mauza Sunderpur, pargana Bara. |
| | B. Sukhdeo Ram ... | Rais, mauza Utghi, Tarbai. |
| | Rai Bahadur Mahabir Pershad Narain Singh. ... | Rais, Arail. |
| | M. Mahesh Pershad ... | Zamíndár and pleader, Naini, pargana Arail. |
| | B. Girja Bakhsh Singh ... | Zamíndár, Karchana Khas. |
| | Raja Ram Partab Singh ... | Rais, Manda, pargana Khairagarh. |
| | Lal Durgijay Singh ... | Zamíndár, Daiya, pargana Khairagarh. |
| | M. Amir Hasan Khan ... | Zamíndár, Pura Mian, pargana Meh. |
| | M. Sultan Hasan Khan ... | Ditto ditto. |
| | B. Lachman Singh ... | Zamíndár, Jagna Sehonda, pargana Kewai. |
| | B. Jangbahadur Singh ... | Zamíndár, Tardih, pargana Sikandra. |
| | Sheikh Imdad Husain ... | Zamíndár, Phulpur Khas. |
| | M. Ahmad Ali Khan ... | Rais, Mansurabad, pargana Nawabganj. |
| | Mr. T. Wharton ... | Rais, Tharbai, pargana Soraon, |
| | Mir Shokat Ali ... | Sarbrahkar Court of Wards, mauza Shahpur, pargana Atharban. |
| | Lala Bindeshri Pershad ... | Supervisor Kanungo, tahsíl Manjhanpur. |
| Jhánsi ... | Chaubey Janki Pershad ... | Zamíndár, Lalitpur. |
| | Kunwar Debi Singh ... | Jagirdár, Jakhlone, pargana Lalitpur. |
| | Lala Shanker Sahai ... | Zamíndár and pleader, Jhánsi. |
| | M. Baijnath Pershad ... | Zamíndár, Serone, pargana Maraura. |
| | Kunar Bhawani Singh ... | Rais, Geora, Gandera, pargana Tál-Bihat. |
| | Rao Debi Singh Obaridar ... | Rais, Jawara, pargana Lalitpur. |
| | Kunwar Bhoopat Singh ... | Mafidar, Pali, pargana Balapat. |
| | Rao Pahar Singh Obaridar ... | Rais, Narhat, pargana Maraura. |
| | Dewan Prichat Obaridar ... | Ditto. |
| | Kunwar Nirbhai Singh ... | Zamíndár, Banpur. |
| Jalaun ... | Pandit Bhawani Pershad Pathak, | Rais, Orai. |
| | B. Umrao Singh ... | Zamíndár, Imalia, pargana Orai. |
| | Kunwar Pohkar Singh ... | Rais, Bangra, pargana Kunch. |
| | B. Harnam Singh ... | Rais, Amkhera, pargana Jalaun. |
| | B. Lachman Pershad ... | Rais, Cheonk, pargana Kalpi. |
| | Kunwar Zahir Singh ... | Rais, Pur, pargana Orai. |
| | B. Tika Ram ... ... | Zamíndár, Somai, pargana Orai. |
| | B. Daryao Singh ... | Rais, Harauli, pargana Jalaun. |
| | Seth Durga Pershad Marwari ... | Zamíndár, Waoli, pargana Jalaun. |
| | Thakur Sundar Singh ... | Zamíndár, Sheikhpur Buzurg, pargana Jalaun. |
| | B. Sundar Lal ... | Lambardar, Birgawan Khurd pargana Kunch. |
| | B. Tulshi Ram ... | Lambardar, Bohra, pargana Kunch. |
| | B. Kesho Datt ... | Zamíndár, Chamari, pargana Kalpi. |
| | Mir Sadiq Husain ... | Rais, Kalpi. |

## APPENDIX B—(*continued*).

*Revised list of landowners selected for reporting on crop forecasts.*

| District. | Name. | Address. |
|---|---|---|
| Benares ... | Pandit Ram Manohar Dube ... | Rais, manza Kathraon, tahsíl Benares. |
| | B. Nackched Singh ... | Rais, mauza Amba, tahsíl Benares. |
| | B. Dip Narain Singh ... | Rais, mauza Kaithi, tahsíl Benares. |
| | B. Bhola Singh ... | Rais, mauza Baghee Kambhapur, tahsíl Chandauli. |
| | B. Sambhoo Singh ... | Rais, mauza Sarai, tahsíl Chandauli. |
| | B. Harnarain Singh ... | Rais, mauza Phootya, tahsíl Chandauli. |
| | Thákur Jadonath Singh ... | Rais, mauza Sakaidih, tahsíl Chandauli. |
| | B. Gopi Nath Singh ... | Ditto. ditto. |
| Mirzapur ... | Pandit Ram Autar Dube ... | Rais, Besundarpur, Tappa Chaurasi, tahsíl Mirzapur. |
| | Pandit Farsidh Narain Dube ... | Rais, Tarkapur, tappa Chaurasi, tahsíl Mirzapur. |
| | Pandit Surjoo Pershad Pathak ... | Rais, city Mirzapur. |
| | B. Dip Narain Chaudhri ... | Rais, Kolna, tahsíl Chunar. |
| | Pandit Nand Kumar Pande ... | Rais, Sendurva, tahsíl Robertsganj. |
| | B. Harnam Singh ... | Rais, Konrh, tahsíl Konrh. |
| | B. Jadunath Singh ... | Ditto ditto. |
| Jaunpur ... | Rai Madho Singh, Rai Bahadur ... | Rais, Basharatpur. |
| | M. Baram Kishore ... | Rais, Machhlishahr. |
| | M. Saiyid Muhammad ... | Rais, Kheta Sarai. |
| | Thákur Ram Karan Singh ... | Rais, Taraon. |
| | Lala Param Sukh Lal ... | Rais, Singramau. |
| | M. Muhammad Yehia ... | Rais, Mariahu. |
| | Maulvi Saiyid Muhammad Nooh ... | Rais, Machhlíshar. |
| | M. Saiyid Asghar Husain ... | Rais, Shahganj. |
| | Mr. C. Nickels ... | Planter, Pussewa. |
| Gházipur ... | B. Sheo Nath Singh ... | Rais, Ghazipur, |
| | Kazi Nasirul Haq ... | Rais, Yoosufpur. |
| | B. Sheo Pershad Ram ... | Rais, Saidpur. |
| | B. Permanand Rai ... | Rais, Narhi. |
| | B. Jaddu Ram ... | Rais, Amwara, pargana Bahariabad. |
| | B. Sheo-tahal Ojha ... | Rais, Talwal, pargana Ghazipur. |
| | B. Bholi Pershad ... | Rais, Muhammadabad. |
| | B. Bhibhuti Narain Singh ... | Rais, Kundesar, pargana Muhammadabad. |
| | B. Gulab Rai ... | Rais, Kasimabad, pargana Zahurabad. |
| | B. Rasal Rai ... | Rais, Gahwar, pargana Zamania. |
| Ballia ... | Hafiz Muhammad Abdul Samad ... | Rais, Pharsatar, pargana Sikandarpur. |
| | B. Udit Singh .. | Rais, Maniar, pargana Kharid. |
| | Pandey Padamdeo Narain ... | Rais, Bairia pargana Doaba. |
| | B. Har Charan Singh ... | Rais, Hajauli, pargana Kopachit. |
| | B. Bishun Pershad ... | Rais, Hanomanganj, pargana Ballia. |
| | B. Sahdeo Narain Singh ... | Rais, Chilkahar, pargana Kopachit. |
| | B. Ram Perkash Singh ... | Rais, Birpura, pargana Sikandarpur West. |
| | B. Kuldip Narain Singh ... | Rais, Jigirsand, pargana Kharid. |
| | M. Bhawani Pershad (Sadr Kanungo Pensioner). | Rais, Balupur. |
| Gorakhpur ... | Mirza Ibrahim Beg ... | Mohalla Basantpur. |
| | M. Abdul Ghaffoor ... | Assistant Manager, Court of Wards, Dumri Bansgaon. |
| | Mr J. J. Holdsworth ... | Proprietor, Lehra estate, tahsíl Maharajganj. |
| | Mahant Ram Ratan Gir ... | Rais, Harpur, tahsíl Maharajganj. |
| | Pandit Raghunandan Misr ... | Rais, Bakuchi, tahsíl Deoria. |
| | B. Birjan Singh ... | Rais, Gauri, tahsíl Deoria. |
| | Rája Mahesh Partab Singh ... | Rais, Anoula, tahsíl Bansgaon. |
| | B. Lal Kharag Chand ... | Rais, Gorakhpur and Golo, tahsíl Bansgaon. |
| | B. Har Pershad Singh ... | Rais, Paikoli, tahsíl Hata. |
| | B. Debi Pershad ... | Rais, Hetunpur, tahsíl Hata. |
| | Mr. Duncan Ricketts ... | Manager, Dumri estate. |
| | Mr. F. Mackinnon ... | Manager, Babhnauli factory. |
| Basti ... | B. Jailal Singh ... | Rais, mauza Rudholi, tahsíl Basti. |
| | B. Dulbahadur Singh ... | Rais, mauza Sikta, tahsíl Domariaganj. |
| | M. Muhammad Ahsan ... | Rais, Maghar, tahsíl Khalilabad. |
| | Lala Udit Narain Lal ... | Ditto. ditto. |
| | Pandit Deokali Pande ... | Rais, mauza Gadawar, tahsíl Demariaganj. |
| | M. Saiyid Wajid Ali ... | Rais, Hallaur Khas, tahsíl Domariaganj. |
| | B. Hanuman Saran Singh ... | Rais, Shanhanpur, tahsíl Harria. |
| | M. Saiyid Muhammad Zakaria ... | Rais, Majhuwa Mir, tahsíl Basti. |
| | M. Askar Ali ... | Rais, Pacca bazar, tahsíl Basti. |
| | Rája Pateshwari Partab Narain Singh. | Rais, Basti Khas. |
| | Mr. W. C. Peppe ... | Birdpur. |

## APPENDIX B—(*continued*).

*Revised list of landowners selected for reporting on crop forecasts.*

| District. | Name. | Address. |
|---|---|---|
| Azamgarh ... | Tahsíldár ... | Azamgarh. |
| | Ditto ... | Mohammadabad. |
| | Ditto ... | Mahul. |
| | Ditto ... | Sagri. |
| | Ditto ... | Deogaon. |
| | B. Baldeo Narain Singh ... | Honorary Magistrate, City Azamgarh. |
| | Mirza Muhammad Salim ... | Pleader, City Azamgarh. |
| | R. Sheodial Singh ... | Manager, Court of Wards' estate, Saraimir. |
| | M. Akmal Husain ... | Manager, Sidhari Court of Wards' estate, Dalalghat, City Azamgarh. |
| | M. Saiyid Muhammad Hashim ... | Member, Local Board, Mohammadabad. |
| | B. Baideo Parshad ... | Rais, Mau. |
| | Sheik Sadar Ali ... | Rais, Hemaipur. Police Circle Didarganj. |
| | Rai Prag Dat Singh ... | Rais, Bankata, Police Circle Atrauli. |
| | Sheikh Fakirulah ... | Rais, Bindwal, Police Circle, Kandhrapur. |
| | B. Basdeo Narain Singh ... | Rais, Surajpur, Police Circle Madhuban. |
| | Molvi Abdul Ghaffar ... | Rais, Bakhshpur, Police Circle Gambhirpur. |
| | M. Wilayat Husain ... | Rais, Deogaon. |
| Naini Tal ... | Raja Hari Raj Singh ... | Rais, Kashipur. |
| | M. Abdul Karim Khan ... | Rais, Kankata, Pargana Gadarpur. |
| | Assistant Commissioner, Tarái ... | Camp *viá* Kichcha. |
| | Deputy Collector Bhábar ... | Camp *viá* Haldwani. |
| | B. Lal Singh, Rai Bahadur ... | Mainajhandi, Tarái. |
| Lucknow ... | Thakur Sheo Dat Singh ... | Lambardar of Amawan, tahsíl Lucknow. |
| | Sheikh Mohsin Ali ... | Taluqdár of Juggaur, tahsíl Lucknow. |
| | M. Jwala Parshad ... | Lambardar of Bijaipur and Kamta, tahsíl Lucknow. |
| | M. Muzaffar Husain Khan ... | Lambardár of mauza Sarosa, tahsíl Lucknow. |
| | Raja Shaban Ali, Khan Bahadur ... | Taluqdár of Salempur. |
| | Thakur Taka Singh ... | Lambardár of Gautam Khera. |
| | Muhammad Ahmad Khan ... | Taluqdár of Kusmandi, tahsíl Malihabad. |
| | M. Muhammad Ali Khan ... | Taluqdár, Saihamau, tahsil Malihabad. |
| | Raja Indar Bikram Singh ... | Taluqdár, Ittaunja, tahsíl Malihabad. |
| Unao ... | Lala Har Prasad ... | Rais, qasba Maurawan, tahsíl Purwa. |
| | Thakur Sultan Singh ... | Taluqdár, Galgalha, tahsíl Unao. |
| | Thakur Baldeo Bakhsh ... | Taluqdár, Akohri tahsíl Purwa. |
| | Maulvi Muhammad Wasi-Uzzaman, ... | Taluqdár, Mianganj, tahsíl Mohan. |
| | Maulvi Muhammad Husain ... | Pensioner, Neotani, tahsil Mohan. |
| | Pandit Daya Shankar Bajpae ... | Taluqdár, Kardaha, tahsíl Purwa. |
| | B. Lal Singh ... | Rais, qasba, pargana and tahsil Purwa. |
| | Chaudhri Mahendro Singh ... | Taluqdár, Bangarmau, tahsíl Safipur. |
| Rae Bareli ... | Thakurain Uderaj Kunwar ... | Taluqdár, Hasanpur |
| | Raja Jagmohan Singh, C. I. E. ... | Taluqdár, Chandapur, tahsíl Drigbijaiganj. |
| | Chaudhri Sharaf Ud-din Husain ... | Zamindár, Inhauna, tahsil Salon. |
| | Mr. G. P. Gartlan ... | Taluqdár, Karowti. |
| | Raja Ram Pal Singh ... | Taluqdár, Korri Sudauli, Post Office Bachhrawan. |
| | Chaudhri Raj Kishore Lal ... | Taluqdár and Honorary Magistrate, Jais. |
| Sitapur ... | Lala Mata Parshad ... | Rais, Khairabad, tahsíl Sitapur. |
| | Thakur Mohar Singh ... | Rais, Bijwat, tahsil Sitapur. |
| | Thakur Ganga Bakhsh ... | Rais, Rampur Kalan, tahsíl Biswan. |
| | Seth Jai Dayal ... | Rais, Kotra, tahsil Biswan. |
| | Thakur Durga Bakhsh ... | Rais, Nilgaon, pargana Munwan. |
| | Thakur Nihal Singh ... | Rais, Urdauli, tahsíl Misrikh. |
| | Thakur Suruj Bakhsh ... | Rais, Kasmanda, tahsíl Sidhauli. |
| Hardoi ... | Lala Sheo Dayal Singh ... | Zamíndár and Secretary Municipal Board, Sandi. |
| | Thakur Daljit Singh .. | Karinda of Rani Kateari, Khair-ud-dinpur. |
| | Misr Gopal Pershad ... | Pensioner Subedar, Mallawan. |
| | Hakim Khadim Husain ... | Rais and zamíndár, Shahabad. |
| | Chaudhri Kanhai Singh ... | Rais and zamíndár, Pali. |
| | Chaudhri Mohammad Azim ... | Taluqdár, Kakrali, Sundila. |
| | Kunwar Durga Pershad ... | Taluqdár, Sarwin, Sundila. |
| | Thakur Maharaj Singh ... | Taluqdár, Hathaura, Pargana Sundila. |
| | Pandit Ram Narain ... | Vakil and Rais, Hardoi. |
| | Nawab Sadiq Husain ... | Zamíndár and Rais, Gopamau. |
| Kheri ... | B. Mandhata Shah ... | Rais, Singahi, tahsíl Nighasan. |
| | Chaudhri Ghulam Mohi-ud-din ... | Native Manager, Kapurthala Estate at Dhaurahra. |
| | Mir Abdus-samad ... | Mafidur, at Mugrehna, tahsíl Mohamdi. |
| | Sirdar Jwala Singh ... | Zamíndár, Aiva, pargana Dhaurahra. |
| | Mr. L. D. Hearsay ... | Taluqdár, Atwa Piparia. |
| | Munsarim ... | Muhmudabad estate. |
| | Maulvi Khalil Ullah Khan ... | Taluqdár, Bharwara, pargana Paila. |
| | Thakur Gopal Singh ... | Rais, Kolva, pargana Aurangabad. |

## APPENDIX B—(*concluded*).

*Revised list of landowners selected for reporting on crop forecasts.*

| District. | Name. | Address. |
|---|---|---|
| Fyzabad ... | B. Inderdat Singh ... | Rais, Khajrahat. |
| | M. Mohammad Akbar Khan ... | Rais, Manjhuae. |
| | B. Narendra Bahadur Singh ... | Rais, Haswar. |
| | B. Balak Ram ... | Pleader, Fyzabad City. |
| | Saiyid Abdul Hashim ... | Rais, Bhadersa. |
| | B. Inderdawan Singh ... | Rais, Sanray. |
| | Mir Tawakul Husain ... | Rais, Lorepur. |
| | B. Ugarsen Singh ... | Rais, Dhaurwa. |
| Gonda ... | Thakur Jagmohan Singh ... | Taluqdár, Dhanawan, tahsíl Tarabganj. |
| | B. Umres Bahadur Singh ... | Taluqdár Atta, tahsíl Tarabganj. |
| | Bhaiya Sripat Bakhsh Singh .. | Manager, Majgawan, tahsíl Tarabganj. |
| | Pandit Kanhya Lal ... | Naib Reasat, Atraula estate. |
| | Lal Raghraj Singh ... | Taluqdár, Mankapur. |
| | Special Manager ... | Court of Wards' estates (Ram Nagar and Singhachanda). |
| | Agent Balrampur estate ... | Balrámpur tahsíl, Atraula. |
| Bahraich ... | Raja Jang Badadur Khan C. I. E., | Rája, Nanpara. |
| | Thákur Fateh Mohammad ... | Taluqdár, Tipraha. |
| | Sheikh Nevazish Ali ... | Taluqdár, Abhapur, Gandara, tahsíl Kaisarganj. |
| | Rája Hira Singh ... | Taluqdár, Jamdan. |
| | Mr. G. W. D. Dick Lander ... | Special Manager Bhinga. |
| | Lala Trilochan Dass ... | Manager, Kapurthala estates. |
| | Nawab Fateh Ali Khan Kazalbash, | Taluqdár, Nawábganj Aliabad. |
| | M. Bihari Lal ... | Tahsíldár, Balrámpur estate, Hariharpur. |
| | M. Mohammed Raza Beg ... | Ditto Risia grant. |
| | M. Barkat Ullah ... | Ditto Charda. |
| | M. Bisheshar Datt ... | Ditto Sirsya. |
| | Sarbarahkar Mallapur Estate ... | Sheopur Bazar through Tahsíldár, Nanpara. |
| | Sardar Baghel Singh ... | Taluqdár, Bhaugha. |
| Sultánpur ... | Rája Dera ... | Dera. |
| | B. Fateh Bahadur Singh ... | Lambardár, Nara pargana Issauli. |
| | Pandit Maheshwar Pershad Sukul, | Lambardár Gararíadih, pargana Jagdispur. |
| | B. Lallu Sahai ... | Lambardár, Meopur Kunbhi, pargana Aldemau. |
| | B. Mohammed Darab Khan ... | Taluqdár, Gangeo, tahsíl Sultanpur. |
| | Mir Altaf Husain ... | Lambardár, Khanabad, tahsíl Sultánpur. |
| | B. Sheo Pershad Singh and Mathura Pershad Singh. | Lambardár, Dekhauli, tahsíl Sultánpur. |
| | Pandit Suraj Narain Acharj ... | Lambardár, Lachmanpur, tahsíl Kadipur. |
| | B. Raghoraj Singh ... | Taluqdár, Baraulia Ramgarhi, tahsíl Musafirkhana. |
| | B. Nageshar Bakhsh Singh ... | Lambardár, Pindora Maharaj, tahsíl Musafirkhana. |
| | B. Shanker Bakhsh Singh ... | Lambardár, Sarai Bagha, tahsíl Musafirkhana. |
| | B. Pirthipal Singh and Debi Dyal Singh. | Permanent lessee, Kohra, tahsíl Musafirkhana. |
| Partábgarh ... | Diwan Ran Bijai Bahadur Singh ... | Taluqdár, Patti Saifabad Hissa II, tahsíl Patti. |
| | M. Shaikh Ahmad Husain Khan Bahadur. | Taluqdár, Pariawan, tahsíl Kunda. |
| | Rája Partab Bahadur Singh ... | Taluqdár, Fort Partábgarh. |
| | Thakur Raghunath Singh ... | Taluqdár, Isanpur, tahsíl Patti. |
| | Mr. W. C. G. Duune ... | Special Manager, Court of Wards, Bhadri Partabgarh. |
| | Raja Rampal Singh ... | Taluqdár, Kalakankar. |
| Bara Banki ... | Rája Tasaduk Rasool Khan C.S.I., | Taluqdár, Jahangirabad, tahsíl Nawabganj. |
| | Mir Bunyad Husain ... | Taluqdár; Zaidpur, tahsíl Nawabganj. |
| | Kazi Ekram Ahmad ... | Taluqdár, Satrikh tahsíl Nawabganj. |
| | Rája Kazim Husain Khan ... | Taluqdár, Bilehra, tahsíl Fatehpur. |
| | M. Nur Mohammed Khan ... | Sarbrahkar, Ramnagar estate. |
| | Sheikh Haider Husain ... | Rais of Fatehpur. |
| | Rai Narain Bali Rai Bahadur ... | Taluqdár, Rampur Daryabad tahsíl Sanehighat. |
| | Saiyid Safdar Ali ... | Zilladár Lohti Circle of Narauli estate. |
| | Thákur Sheo Dat Singh ... | Taluqdár of Shahpur, tahsíl Sanehighat. |
| | M. Amjad Ali ... | Taluqdár, Saidanpur, tahsíl Sanehighat. |
| | Rája Bhagwan Bakhsh ... | Taluqdár of Pokhra Ausari, tahsíl Haidargarh. |
| | Khan Bahadur Mir Bunyad Husain. | Lambardár of Kadipur, tahsíl Haidargarh. |

## APPENDIX C.

*List of papers communicated by the Department to the* Agricultural Ledger.

(1) Notes on the cultivation of Lucerne and Guinea grass for fodder (*Agricultural Ledger* No. 6 of 1897).

(2) A statement showing the dates of sowing crops in the North-Western Provinces and Oudh.

(3) A statement showing the dates of harvesting crops in the North-Western Provinces and Oudh.

# ORDERS OF GOVERNMENT.

No. $\frac{998}{I-\frac{36B}{12}}$ OF 1898.

## RESOLUTION.

REVENUE DEPARTMENT.

*Dated Naini Tal, the 2nd May* 1898.

READ—

Letter No. $\frac{512}{VIII-240}$, dated $\frac{5th\ February}{1st\ April}$ 1898, being the Report of the Director of Land Records and Agriculture, North-Western Provinces and Oudh, for the year ending the 30th September 1897.

OBSERVATIONS.—The report, though prescribed for submission on the 1st February, was not received in the Secretariat till 4th April. The reason of this delay is not stated, but the printing of the report appears to have occupied a period of nearly three months—a point which calls for the Director's special attention. The report has been drawn up in the form prescribed in the eighth of the Resolutions of the Government of India, No. $\frac{3}{39-I}$, dated 20th March 1897, on the proceedings of the Agricultural Conference of 1893 and 1895-96.

2. In *Chapter I* are described the tours of inspection made by the Director, Assistant Director, and the Superintendent of Land Records and Surveys, and the objects which they were meant to serve.

*Chapter II* deals with the progress in the efficiency of the Land Records establishments. The number of qualified *patwáris* continues to rise, and the improvement in the knowledge of surveying, both among *patwáris* and *kanúngos*, is satisfactory. Candidates for the *kanúngo* staff are reported be of a better stamp, and the prospects of promotion continue to be sufficiently attractive. The Government shares the Director's doubts regarding the desirability under present circumstances of making easy the entry of *patwáris* into the higher grades of the administrative service.

3. *Chapter III.—Utilization of Land Records.*—Good progress has been made in the compilation of revised village registers and pargana handbooks. The information contained in the latter will be of peculiar value to the District Officer in enabling him to gauge any agricultural deterioration which may affect his district. In the current year it is proposed to utilize selected members of the Land Records staff in procuring information regarding the sugar industry of these Provinces.

4. In *Chapter IV* a brief account has been given of the connection of the Department with the branches of scientific enquiry under Imperial control. Important work has been done by the Cadastral Survey Department for cartographical purposes. The steps taken in connection with the spread of veterinary science summarized

in this chapter have formed the subject of a separate report, and therefore call for no special comment at this juncture. Interesting experiments in agricultural chemistry were made in the Government farms and *úsar* reserves with the assistance of Dr. Leather. Under the head of Statistics the information which is annually collected by the Department of Land Records and Agriculture is succinctly detailed. The foreign traffic with Nepal and Tibet showed a general decline, except as regards the import trade from Tibet, the trade in wool, salt, and horns being brisker than usual. Rail-borne traffic increased slightly in bulk, the imports of grain consequent on the famine showing a marked rise. A scheme has been set on foot since the close of the year to register the river-borne traffic between these Provinces and Bengal. The utility of the agricultural statistics of the past year will be more appropriately reviewed by this Government in connection with the Annual Administration Report of the Board of Revenue. The usual forecasts of crops were issued by the Director, who has taken steps to obtain a more extensive supply of information for his memoranda. Crop-cutting experiments were also continued, and the prescribed quinquennial return furnished.

5. *Chapter V* is devoted to a description, on the lines indicated by the Government of India, of the scientific and local enquiry conducted under provincial direction. It includes an account of the work done during the year at the Government Experimental Farm at Cawnpore. The value of the Farm has been emphasized by the experience of the recent famine, and it is encouraging to observe the help that has been given to the landowning class by the trained staff of mechanicians there employed, both in the construction and supply of irrigating apparatus and in the important province of well-sinking. A cheap and improved plough has also been invented during the year. In addition, the Farm has been the medium for the distribution of improved varieties of seed grain, both in and out of India, and has been the centre for valuable experiments in agricultural chemistry, already mentioned above. Of the private farms described by the Director in Section B of his fourth chapter, that at Meerut has been most successful in its agricultural experiments. This farm, which owes its present status to the personal superintendence of the late Collector, Mr. Wyer, has now been taken over by the District Board and will be under the control of the Director. In the Court of Wards estates also much useful work has been done in the direction of stock-breeding, the improvement of field staples, and the afforestation of ravine lands. The stimulus given by the meeting of the Managers of the Court of Wards at Cawnpore will, it is hoped, be productive of valuable results, and more may be expected when the estates are relieved of the burden of famine, which has recently curtailed their resources.

6. Under Section D the Director has given the observations made during the past year in the reclamation of *úsar* lands on the Government reserves at Juhi and Gursikran and the private estates at Cherat and Amramau. The effects of enclosure on the condition of the land

have been encouraging, and satisfactory results are anticipated from experiments in the mixture of sand and gypsum with the *úsar* soil. The difficulties in the way of getting trees to grow on *reh*-affected land are formidable and have yet to be overcome; but the Director reports a marked improvement during the year in the grass vegetation. That reclaimed *úsar* land needs constant attention to prevent relapse has been demonstrated conclusively in the Amramau estate. The Director has also noticed in this chapter the work done by the Government Gardens in Saháranpur and Lucknow in the naturalization of foreign plants, the issue of seeds and fruit trees, and the experiments made in preservation of fruit by evaporation. These subjects are separately dealt with in the reports of the individual gardens.

7. *Chapter VI.*—The question of the advancement of agricultural education has engaged the attention of the Local Government. The Lieutenant-Governor agrees with the Director that the course of primary education now given in the vernacular schools of these Provinces is a sufficient passport for employment as a village accountant, and he places little faith in the utility of agricultural training for bringing out administrative ability when unsupported by a strong foundation of literary or scientific knowledge. Sir Antony MacDonnell, while admitting the theoretical arguments in favour of the establishment of a high class agricultural college, is of opinion that the time has not yet come when its advantages could be sufficiently utilized, and that there are more pressing questions which must first be settled in these Provinces. At the same time His Honor is fully alive to the importance of establishing facilities for education of a practical or technical character, and he has already taken steps in that direction.

8. *Chapter VII* records the progress made in connection with the five points prescribed by the Government of India. The instructions which, the Director states, will shortly be issued under the orders of the Board should go far to securing the acquisition of that information about each district which is required by District Officers to anticipate and remedy the effects of agricultural deterioration. The systematic classification of that information in ledger form has been put in hand by the Director, who, in this work, will receive the assistance of the Reporter on Economic Products.

9. Much that is new has been introduced into the working of the Department during the past year. This has been done under the pressure of additional labour induced by famine, and in concluding this review the Lieutenant-Governor and Chief Commissioner desires to recognise the solid and useful work done by the Director and his staff.

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ORDER.—Ordered that a copy of the above Resolution be forwarded to the Director of Land Records and Agriculture, North-Western Provinces and Oudh, for information and guidance.

H. F. EVANS,

*Chief Secy. to Govt., N.-W. P. and Oudh.*

# REPORT

ON THE

# Operations of the Dept. of Land Records & Agriculture,

## NORTH-WESTERN PROVINCES AND OUDH,

*FOR THE YEAR ENDING THE 30TH SEPTEMBER 1898.*

*ALLAHABAD:*

North-Western Provinces and Oudh Government Press.

*1898.*

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# REPORT

ON THE

# Operations of the Dept. of Land Records and Agriculture,

## NORTH-WESTERN PROVINCES AND OUDH,

*FOR THE YEAR ENDING THE 30TH SEPTEMBER 1898.*

No. $\frac{212}{\text{VIII—277}}$ OF 1898.

FROM

J. S. MESTON, ESQ.,
DIRECTOR OF LAND RECORDS AND AGRICULTURE,
N.-W. PROVINCES AND OUDH,

To

THE CHIEF SECRETARY TO GOVERNMENT,
N.-W. PROVINCES AND OUDH.

*Dated Lucknow, the 23rd November* 1898.

SIR,

I HAVE the honour to submit the Annual Report on the work of this Department for the year ending the 30th September 1898. Last year's report was the first to be drawn up in the new form prescribed by the Government of India in its eighth Resolution of 20th March 1897. It had therefore to describe in some detail the scope of the Department's connection with the various branches of work and inquiry with which the Government of India desires the Department to be associated. The present report will not repeat the same general explanations; all that it does is to briefly summarise the work done during the year in the different fields of our operations.

## CHAPTER I.

### PREFATORY.

2. I was in charge of the Department during the whole of the year under report. The post of Assistant Director was held by Saiyid Muhammad Hadi, M.R.A.C., M.R.A.S., except for the period from 9th November to 20th December 1897, when he was on privilege leave, and my Personal Assistant, Mir Saiyid Husain, officiated for him in addition to his own duties.

3. My annual tour began on 17th October 1897, when the Survey Offices at Bareilly and Kheri were inspected, and a visit was paid to Pilibhít in order to settle some preliminaries about the impending survey of that district. The first ten days of November were spent at Cawnpore, where a number of questions connected with the Farm and Agricultural School had been lying over for settlement. On the 11th of November I joined my camp at Háthras and began a detailed inspection of the Aligarh district for purposes of a settlement forecast. Very soon after, I was called away for ten days, on special duty, to Allahabad, and for a week to Sháhjahánpur, to meet the Senior Member of the Board of Revenue and discuss certain settlement matters. In December I marched, through the Bulandshahr district, to Meerut to preside over an inquiry into cantonment taxation. This occupied ten days, and after a visit to Saháranpur (by rail) to inspect the Botanical Gardens, I returned to work in Aligarh. During January, Mr. Duthie joined me in a visit to the Gursikran and Chherat Usar reserves; and on 13th January, having finished my inspection of Aligarh, I broke up camp at Sikandra Rao and proceeded by rail to Cawnpore. After visits to Allahabad, to inspect the map depôt at the Government Press, to Sháhjahánpur, to arrange some difficulties in the survey programme with the Settlement Officer, and to our Juhi Usar reserve with Mr. Duthie, I rejoined my camp at Lucknow on 30th January and marched through Bara Banki into Gonda. An inspection of that district for its settlement forecast occupied me till the end of the month. In March I went by rail to Benares to inspect the Sadr Kanúngo's

Office in that district, and to Meerut to conclude the inquiry into cantonment taxation. In April I inspected the Special Offices at Basti and Gorakhpur, and selected the site for a new usar reserve near Unao. No other work called me away from headquarters, except an investigation at Gonda into misconduct by a departmental subordinate, and on 3rd May I went to Naini Tal. In July I conducted kanúngo examinations at Lucknow, Bareilly, Aligarh, Cawnpore and Gorakhpur, and examined the settlement work at Budaun: but at the end of the month my tour was cut short by my having to serve on a Revenue Bill Committee, and the rest of the kanúngo examinations were conducted by the Assistant Director.

4. From the 1st October to the 9th of November 1897 the Assistant Director stayed at Cawnpore, supervising the distribution of imported carrot and other agricultural seeds, and holding trials of Agricultural implements. From the 10th of November to the 21st of December he was on privilege leave, on return from which he went in the beginning of January to inspect the usar reserves in Aligarh, afterwards accompanying Mr. Duthie and myself to the reserve at Gursikran. The remainder of the month of January and the first fortnight of February were spent by him in making inquiries into the varieties of sugarcane grown in Farukhabad, Bara Banki and Fyzabad and in conducting sugarcane crop-cutting experiments. During the latter half of February and in the month of March he attended agricultural shows in Aligarh, Bulandshahr, Muzaffarnagar and Meerut; carried out sugarcane inquiries in those districts; inspected the Meerut Demonstration Farm, where he also tested and reported on the Chicago Company's Aërmotor; and saw Mr. Duthie at Saháranpur with reference to the identification of some of the sugarcane varieties. In April 1898 he examined and reported upon several usar blocks in the districts of Sultánpur, Lucknow and Unao. In the last week of April he made arrangements for the meeting of zamíndárs held in that month at the Cawnpore Farm and took them to the reserve at Juhi. He then conducted the final examination of the Agricultural School students in several subjects. In May 1898 he attended the Agricultural Show at Bahraich and demarcated the block of usar land taken up at Unao, with the permission of the Local Government, for babul-growing experiments. In the month of June he made a tour in Rohilkhand and a few other districts in connection with an inquiry into the condition of the sugar industry and trade of the Provinces. In July he assisted me in conducting the kanúngo examination at Lucknow, Bareilly, Aligarh, Cawnpore and Gorakhpur, and visited the usar reserve at Gursikran. In August he conducted the kanúngo examinations at Fyzabad and Benares, and held demonstrations of improved ploughs in Fyzabad and Bara Banki. In the middle of August he went to Unao to start operations at the new usar reserve. Thereafter he was busy with the Cawnpore Farm, of which he had been in direct charge since 8th February. He also paid frequent visits to the Juhi and Unao usar reserves.

5. The Superintendent of Land Record Surveys, Mr. G. B. Scott, visited the several districts under survey as soon as the field season opened. In Gonda, prior to Mr. Bedford's arrival from Lalitpur, he organized and started patwári training classes. From 1st to 15th November he personally trained a class of junior Civilians in survey work. At the request of the Senior Member of the Board of Revenue he was employed throughout December in re-demarcating several lost and disputed boundaries in alluvial tracts of Sháhjahánpur, where the loss of landmarks over large areas made it extremely difficult to relay these boundaries and satisfy the numerous disputants. From 1st to 15th January he trained a second class of junior Civilians. He then marched through the Cawnpore, Fatehpur and Allahabad districts, testing the accuracy of the old settlement maps by personally running check lines across numerous villages. This occupied him till the middle of March. He next proceeded to Gonda and personally examined the work of patwáris in seven Inspectors' circles, tested its accuracy on the ground, and made the patwáris do small pieces of survey in his presence to test their qualifications. Bahraich, Kheri, Bareilly and Sháhjahánpur were then visited and an examination made of the

check lines for testing accuracy of the work; the progress in record work was also inspected. In April Mr. Scott examined survey work in the Naini Tal district, and, in anticipation of the extension of the contour survey, trained some Garhwáli Surveyors in that work. In May he assisted Mr. Shaw, Deputy Collector, to start the demarcation of zones. He was on privilege leave from 1st to 20th July. On his return he visited all the Survey Offices from Bahraich to Bijnor during July and August. In Bahraich he examined the work done in connection with the re-demarcation of a portion of the Nepál-Bahraich boundary, and submitted a report with map and data to the Deputy Commissioner.

## CHAPTER II.

### Land Records Establishments.

6. A detailed report on the working of the Land Records side of this Department will be contributed for insertion in the Board's Annual Administration Report. The present chapter, in accordance with the wishes of the Government of India, deals only with whatever action has been taken towards the gradual improvement of the Land Records staff.

7. *Training of patwaris.*—The number of schools continues to fluctuate according to local requirements. The schools which had been closed last year on account of the famine have now been re-opened; likewise the Meerut School, survey operations having now closed in that district. On the other hand the scarcity of unpassed patwáris and the abundance of passed candidates have enabled the schools in Ballia, Muzaffarnagar and the Lalitpur sub-division to be stopped, any stray pupils being now sent to Gházipur, Saháranpur and Jhánsi respectively. The total number of patwáris and assistants in the United Provinces (exclusive of Sháhjahánpur, Garhwál and Almora) was 28,805 of whom 24,460 or 84·93 per cent. had passed through the school course. The number of patwáris exempted from examination fell from 3,326 to 3,093, and the number of those who had still to pass, from 1,288 to 1,252. The most important step taken during the year in raising the standard of education among our patwáris was the introduction of the system of simultaneous examinations referred to in last year's report. The first examination under the new rules was held in 26 districts in April 1898, printed papers in patwari Rules and Duties being set by the Director and in arithmetic and mensuration by the Superintendent of Land Record Surveys. The results which are tabulated below, can hardly be called satisfactory :—

| | | Number examined. | Number passed. |
|---|---|---|---|
| (1) | Rules and Duties of Patwáris ... ... ... | 929 | 257 |
| (2) | Arithmetic ... ... ... ... ... | 960 | 170 |
| (3) | Mensuration ... ... ... ... ... | 945 | 392 |

As the papers were probably a shade too stiff, they will be made a little easier in future. But they were well within the scope of an intelligent patwári's knowledge; and there are now good reasons to believe that the standard of efficiency in past years has been, by the mistaken leniency of local examining committees, allowed in many districts to drop unduly. The new system of examination ought to prevent this from occurring in future.

The total number of pupils who attended the schools during the year was 3,241; of whom 817, or 25·21 per cent., passed out fully qualified.

The thorough training of patwáris in survey continues to be actively carried on at the different survey parties employed in the Provinces. As each district comes under survey, its patwári school is temporarily closed, and the teacher and students alike are drafted off to a practical field training. The number of actually placed patwáris who worked with the survey parties employed in their districts came up to 1,533, of whom 1,295 qualified and surveyed villages, the remainder being found incompetent through age or stupidity. The result for the year, it may be noted, of these cadastral surveys by patwári agency has been that 2,305 square miles were mapped and records written for 2,080 square miles, at an average cost of Rs. 49-12-0 per square mile, or, if the cost of superintendence and implements be included, of Rs. 59-4-0 per square mile.

8. *Prospects of the patwári.*—The necessity of improving the patwári's position has been recognized by the Board of Revenue, and detailed proposals for establishing a more uniform and liberal scale of pay have been submitted. The heavy charges laid on the Patwári Fund by our revisional surveys stand in the way of any immediate general rise in pay; but the need for greater generosity has now been admitted and steady progress may now be expected.

The draft rules for the reorganization of patwáris' circles and the gradation of patwáris in Oudh, which were submitted last year, received the approval of the Board of Revenue; and as soon as the estimates called for from Commissioners as to the required number of circles have been received for all the districts, the grades of pay will be finally fixed and Government moved to sanction such increased expenditure as is needed to improve the position of the patwáris and as is warranted by the increased income from the patwári rate due to the re-assessment of the land revenue. The revision of patwáris' circles in Kheri, Bahraich and Gonda has been deferred till the survey operations are over. In the meantime the cost of the patwári establishment in Kheri has, as a temporary measure, been increased from Rs. 3,942 to Rs. 4,582 per mensem to relieve a number of overworked and underpaid patwáris.

In the North-Western Provinces the final scale of revised pay and circles has at last been completely introduced in Muttra, Agra and Etah. Undeserved hardship to patwáris whose pay has been permanently reduced by the introduction of the revised scale is avoided by the grant of personal allowances to the extent of Rs. 108 per mensem in Agra, Rs. 53 in Muttra and Rs. 93 in Etah.

The scale of pay has been revised in Garhwál, and patwáris' circles have been reorganized in the Gurserai estate of Jhánsi, as well as in the eleven recently assessed parganas of Bijnor; while a proposal to ameliorate the position of Basti patwáris by substituting for the present intermediate scale the final scale fixed in 1890 has been submitted to the Board of Revenue.

During the past year out of 385 new appointments to kanúngoships or assistant kanúngoships reported to this office, only 20 have been given to patwáris. The rule as to the preferential claims of patwáris to kanúngo vacancies is presumably being worked with greater care than formerly. The rule permits *duly qualified* patwáris to rise to kanúngoships in their own tahsíls; but patwáris cannot qualify unless their district officer considers them in every way suitable candidates and nominates them for the annual examinations conducted by this Department. The practical effect of the rule thus depends largely on the discretion of district officers, who may be trusted to see that the patwári element does not acquire undue prominence in the kanúngo staff—a result which would be injurious to the best interests of the land records establishments.

9. *Training of kanúngos.*—The annual divisional examinations of kanúngos were as usual conducted by the Director and the Assistant Director during the rainy season. Out of 263 candidates who appeared for examination 77 passed in all subjects and 184 in part. No improvement is noticeable in the result of examinations throughout the Provinces, the Fyzabad Division again sending up a particularly weak set of candidates. Of the 77 successful candidates 13 have not yet received practical training in surveying and will be required to join a survey party; but on the other hand 170 candidates, who were sent by district officers specially for survey training, have qualified and received certificates from Survey Officers.

The somewhat unsatisfactory results of the annual kanúngo examinations bring into prominence the value of the training offered by the Cawnpore Agricultural School. Fifteen selected kanúngo candidates, on nomination by their district officers, are annually admitted into the School, the course of study in which is directed at equipping them with a theoretical and practical knowledge of agriculture and at developing their powers of observation and reasoning. The leaven of our ex-students employed in districts is still very small, but as years go on it must tend to raise the general efficiency of the kánúngo staff.

10. *Prospects of the kanúngo staff.*—During the past year 29 kánúngos received promotions to Naib Tahsíldárships, but only two were permanently appointed to that post; two more were provided with miscellaneous superior appointments. Seven kanúngos were nominated for Naib Tahsíldárships on account of meritorious services in famine relief work; and the recommendations of the Public Works Department authorities in regard to a number of others will be considered when next year's selections come to be made. Amidst the rush of capable and well educated candidates for the post of Naib Tahsíldár, it is not unnatural that the claims of the kanúngo staff should often be overlooked. But the only immediate way to improve the efficiency and integrity of our land record supervising staff is a reasonable prospect of promotion to the superior revenue appointments; and the executive capacity and experience of a good kanúngo are not always recognised at their true value.

11. *Kanúngo Inspectors.*—These officials were employed in inspecting the tahsíl registers and patwáris' papers in 15 districts. Their inspection reports are of very unequal value, and the general standard of their work is formal and unsatisfactory. It is difficult to exercise any effective supervision over them (*quis custodiet ipsos custodes?*); and at present the most probable method of improving the work seems to be to bring some fresh blood into the staff, which will accordingly be done as occasion offers.

## CHAPTER III.

### Utilization of land records.

12. This chapter deals with the steps taken to improve the material which forms the basis of the annual analysis of districts. Of the marginally * noted 16 districts in which the settlement has been revised, village registers and pargana books in the new form have been completed. Pargana hand books have also been printed in the first eleven of these districts, and are being drawn up in the Partábgarh, Basti and Gorakhpur districts. The preparation of hand books in Jhánsi, as also of the revised registers and pargana books for the Gurserai estate of that district, will soon be taken up by the special establishment at present employed in Gorakhpur and Basti. The work in Bijnor, Meerut, Lalitpur subdivision, Sháhjahánpur and Bahraich is in progress along with the settlement operations.

* (1) Muzaffarnagar
(2) Bulandshahr
(3) Saháranpur
(4) Unao
(5) Rae Bareli
(6) Lucknow
(7) Bara Banki
(8) Budaun
(9) Hardoi
(10) Sultánpur
(11) Sitapur
(12) Fyzabad
(13) Partábgarh
(14) Gorakhpur
(15) Basti
(16) Jhánsi

Out of the districts mentioned above, the new pargana books were properly maintained and annotated in Muzaffarnagar, Bulandshahr, Saháranpur, Rae Bareli, Bara Banki, Gorakhpur and Jhánsi. In the remaining nine districts they could not however be utilized, partly because they were only lately received from the Settlement Department and partly because the entries for years subsequent to settlement were incomplete. The revised form of pargana book has been found most valuable in localizing the deteriorated parts of a district and in showing the direction in which inquiries as to the causes of deterioration are needed. [A detailed note as to such tracts will, as usual, be submitted to the Board of Revenue for its Annual Administration Report.] The old pargana books also were widely used and carefully kept up in several districts, extraordinary cases of rent frauds being detected and noted by the Collectors of Allahabad and Farukhabad. It takes time, however, for the district authorities to appreciate the full value of these compilations; and there can be no doubt that the old registers of village statistics were prohibitively bulky and clumsy. As the new pargana books come into use throughout the Provinces, their utility will, it is believed, be more and more recognised.

13. The utilization of the land record staff in special agricultural inquiries was advocated by the Government of India in paragraph 6 of the third Resolution

of 20th March 1897. No general employment of the staff for such a purpose was aimed at during the year, but on the strong recommendation of Dr. Leather that the ex-students of the Cawnpore School should be utilized in this direction, a number of kanúngos who had passed through the School were, with the permission of their district officers, called on for information in connection with the sugarcane inquiry which is being conducted by the Assistant Director. The reports have now been received. Though not all of equal value, they show how usefully the technical knowledge of our passed students can be employed in this way, and justify Dr. Leather's suggestion that through them our sources of agricultural information should be steadily and systematically supplemented.

## CHAPTER IV.

### Scientific and National inquiry under Imperial Control.

14. **Geography.**—The connection between the cadastral surveys in progress in these Provinces and the cartographical branch of the Survey of India Department was explained in detail in last year's report.

The original village maps of the recent survey of the Meerut district and those of the Lalitpur sub-division of the Jhánsi district and of two tahsíls of the Sháhjahánpur district have been despatched to the drawing office of No. 2 and 8 traverse party of the Survey Department. The remaining maps of Sháhjahánpur will be sent shortly. The maps of four parganas of Bijnor will be ready for despatch in December, and those of the Bahraich district in March. From these the existing district and standard maps of Meerut can be brought up to date; the maps of district Jhánsi completed; a district map of Sháhjahánpur, of which no reliable maps are at present available, can be compiled; and the existing district map of Bahraich corrected. Of Bijnor only four parganas out of 15 have been resurveyed, the settlement of the remaining eleven parganas having been made on the old maps. These were not based on theodolite traverses; so that they cannot be utilized for cartographical purposes as they stand, and a complete district map cannot be compiled.

15. **Geology.**—There is nothing to report under this head, except that the usual returns of the production of minerals in these Provinces and the working of mines, if any, were submitted to the authorities mentioned in the last year's report. Notes of a general description, drawn up by the Assistant Director, regarding the industries in which minerals are used in these Provinces were also furnished with the return to the Reporter on Economic Products to the Government of India.

16. **Botany.**—Mr. J. F. Duthie, Director of the Botanical Department, Northern India, visited the usar reserves at Gursikran and Juhi, in company with the Assistant Director and myself, during the cold weather. At both these places he made a practical examination of the causes which led to the failure of trees, under ordinary conditions, to grow on usar soil. In all the cases examined it was found that the roots had reached a hard subsoil bed of kankar or clay. Failing to penetrate this, the roots had either lost their vitality, the tree thus perishing, or had become distorted into a lateral direction, thus checking and stunting the growth of the tree. Mr. Duthie also inspected the Chherat reserve. His report on the usar reserves is already in the hands of Government.

He presented us with a collection of Australian grass seeds for trial sowings on poor lands. He also very kindly permitted his skilled draftsman to make a number of drawings of the different varieties of sugarcane, into which the Assistant Director has been making special inquiries (*vide* paragraph 4).

17. **Economic Products.**—The Reporter on Economic Products to the Government of India was supplied with two sets of articles required according to his programme for 1895-96 and six sets of articles in his 1896-97 programme; also with four specimens on miscellaneous indents. Botanical specimens of different parts of the cotton plant, varieties of *Sorghum* and a collection of plants from which sola pith is extracted were the articles chiefly procured by us. Our outlay was only Rs. 81-4-0 out of Rs. 500 allotted.

18. **Veterinary Science.**—The report of the Superintendent of the Civil Veterinary Department, describing both the Imperial and Provincial sections of his work, has already been submitted to, and reviewed by Government.

A.—HORSE-BREEDING.

The progress made during the year in civil veterinary work may be thus epitomised :—

*i.—Distribution of Imperial stallions*—The number of horse stallions allotted to the Province rose from 72 to 78 and of donkey stallions from 83 to 93. Of these, 66 horse and 91 donkey stallions were at stud work against 57 and 75 respectively in the last year. It was conjectured that the contraction of operations last year on account of the scarcity would be only temporary, and this hope has been fulfilled.

*ii.—Registration of mares and (viii).—Registration of produce.*—This is effected through the instrumentality of patwáris in 15 districts. Imperfections in the system were complained of last year, and District Officers were requested to issue such orders to the kanúngo and patwári staff in their districts as would prevent the laxity observed in past years' returns. The present system of collecting information through patwáris has many defects, and it is understood that the Government of India has consented to its discontinuance.

*iii.—Selection and branding of mares.*—The number of branded mares on the Provincial register at the close of the year was 3,458 against 3,488 last year. The selection of mares, as stated in last year's report, is entirely in the hands of the Superintendent, Civil Veterinary Department, who branded 475 new mares during the year. The system of branding is slowly gaining in popularity with zamíndárs, and the objections to the brand in Hardoi, which were referred to last year, have been successfully overcome. Except in Etáwah, no mares have been branded on being served by Provincial stallions; and Government has, for the present, waived its right to insist on branding such mares. The Civil Veterinary Department use necessary vigilance to prevent the services of Provincial stallions being wasted on inferior mares.

*iv.—Elimination of unfit animals from the register.*—Six hundred and sixty-three branded mares were removed from the register. Of these, 310 had died, 336 had been sold, and the rest stolen or proved to be barren or unsound.

*v.—Inspection of stallions.*—The various stands in these Provinces were systematically visited by the Superintendent, Civil Veterinary Department, and a copy of each inspection report received from him was forwarded to the District Officer concerned for information. A large number of district officials also visited the stallion stables during the year.

*vi.—The supply of district stallions.*—The Provincial establishment of horse and pony stallions now consists of 59 animals (33 horses and 26 ponies), as against 60 last year. To these should be added 16 stallions, the services of which are available to the public, although they are the property of District Boards, Court of Wards' estates, and private individuals. There were 19 of this class last year. Notwithstanding the decline in the number of stallions, stud work made a marked advance during the year. Twenty-nine stallions served their full number of 50 mares each, and the total coverings were 2,773 at public stands and 166 at private stands, against 2,460 and 160, respectively, in the former year. No fee is charged for the services of Provincial or District Boards' stallions anywhere except at Etáwah, and the question of imposing such fees has already been decided by Govern-

ment in favour of the present practice. The demand for stallions was greater than could be met in the present restricted state of Provincial funds. There are at present four empty stands, and the Superintendent has no less than 39 applications for stallions which cannot be complied with until our finances improve. Arabs continue the favourite sires with breeders, and the Superintendent observes a distinct improvement in the young stock which are growing up as the result of his operations. He was able this year to brand five fillies, the offspring of Provincial sires, as fit to mate with Imperial stallions. The number of donkey stallions at stud work is the same as last year: three belonging to the Department and eight to Court of Wards' estates. Applications for five more donkeys remained uncomplied with. The statistics of coverings are incomplete, but it is believed that fairly satisfactory progress is being made. The great need of suitable animals for ordnance purposes still continues, and a scheme for the special encouragement of mule-breeding has recently been worked out in detail and submitted to Government.

*viii.—Elimination of inferior sires.*—During the year under report one of our stallions was sold as being unfit for stud purposes; 477 colts were castrated by salutris paid from Imperial funds and 145 by Provincial Veterinary Assistants. The number of castrations was restricted by the deputation of two Imperial salutris to the Bacteriological Laboratory and of five Veterinary Assistants to the Tirah Field Force during the year.

*ix.—Instruction in horse-breeding.*—There is no Veterinary School in these Provinces. Under a scheme sanctioned by Government two students are annually taken and given one year's practical training in salutri's work at Bábúgarh and then sent to the Veterinary College at Lahore to qualify as Veterinary Assistants. Each student is allowed a stipend of Rs. 5 per mensem while at Bábúgarh, and of Rs. 6 per mensem at the College. The College fees of the students, their travelling allowance and the cost of books and instruments are borne by the Provincial branch of the Civil Veterinary Department. The Depôt Farm at Bábúgarh continued to work with good results during the year, but no instruction classes were held at it.

B.—Cattle-breeding.

The supply of Government bulls in districts is gradually dwindling, the matter being one in which very few District Boards can be induced to interest themselves. As against the 22 bulls reported last year, there are only 19 now, two having died and one being lost: of the 19, three are unserviceable through age. But if District Boards do not see their way to taking the lead in improving agricultural stock, the question is being vigorously taken up by many Courts of Wards' estates and private individuals. The extent to which we assist them is described later (paragraph 24-VI), in connection with the Cawnpore Farm.

C.—Investigation and Prevention of Horse and Cattle Disease.

There are now 23 Veterinary Assistants attached to various District Boards in these Provinces. They were employed in the treatment, suppression and prevention of disease among horses and cattle, and in the castration of colts. The number of these men is still very far from sufficient to cope with the frequent epidemic outbreaks in these Provinces, and in many instances the objectionable system of sending them from one district to another to treat local outbreaks has to be resorted to. But there are reasons to believe that some good work is being done and that the people are beginning to get acquainted with the necessity of isolating diseased cattle. Statistics of cattle disease are believed to be more complete than they were last year, 42 out of the 48 districts having sent in reports. Efforts are being made, chiefly in the interests of bacteriological research, to get more timely and

accurate information of epidemic outbreaks; and the District Officers have been asked to insist on a more careful compliance with the rule which provides for the immediate report by patwáris of diseases in their villages. The year under report was a healthier one than its predecessor. There were altogether 25,783 cases of rinderpest reported in 1897-98 against 33,191 in the year before. Anthrax was rare, but deadly. Foot-and-mouth disease on the other hand was abundant, but only seven per cent. of the cases were fatal. Cases of both surra and glanders were reported on the Saháranpur-Rájpur dák line; and a few scattered cases of these diseases were found elsewhere, but no treatment was practicable. There is no veterinary dispensary throughout the Provinces except one at the Cawnpore Farm, where the work done is very inconsiderable. A few District Boards are considering the possibility of starting local dispensaries; but hitherto it has been difficult to arrange for the necessary funds.

**19. Agricultural science**—(*a*) *Chemistry.*—Owing to the absence of Dr. Leather from India for the greater part of the year under report, it was not possible for the Department to obtain as much assistance in this direction as it used to do. A few samples of manure to be used in the Cawnpore Farm experiments were, however, analysed by Mr. Collins of the Chemistry Department before he left India, and a few samples of usar soil were subsequently analysed by the Principal of the Dehra Dún Forest School while in charge of the Chemical Laboratory at Dehra. On his return from home, Dr. Leather made an analysis of the water of a well sent by the Secretary to the Kishengarh Darbar. When used in the engine boilers at the spinning mills of Kishengarh, the water on evaporation left behind incrustations which were troublesome to get rid of. Dr. Leather, on examining the water and the incrustations, found that the latter were due to the presence of sand and carbonate and sulphate of lime, and suggested a practical remedy which was duly communicated to the Darbar. It consisted in treating the water with burnt lime, allowing it to settle in a tank and drawing off clear water for use.

(*b*) *Mechanical inventions.*—Nine applications for leave to file specifications of inventions relating to agricultural machinery were received for report from the Government of India. On a few of them it was found necessary to obtain the opinion of a non-official expert; but the majority were examined by the Assistant Director, who recorded his views as to the novelty and utility of the projects.

**20. Statistics.**—The figures collected and compiled during the year are classified as under:—

(1) *Statistics of traffic.*—The following traffic was registered during the year 1897-98:—

(*a*) *Foreign traffic.*—The statistics of trade with the countries of Tibet and Nepál were reviewed in the Annual Report of the Foreign Trade of the Province for 1897-98; the chief variations are noted below:—

The import trade with Nepál fell very slightly as compared with last year's figures. The imports of wool continued to expand; while those of salt and borax were almost the same as in last year. Exports to Tibet were unusually heavy owing to large despatches of grain from Almora. The exports of unrefined sugar further declined during the year; being about half of what they were in 1895-96.

Owing to the removal of the restrictions placed by the Nepál authorities on the export of grain during the preceding year, the import trade with Nepál in 1897-98 recovered partially from the fall of last year; the imports of grain alone having been four lakhs of maunds more than in the preceding year. Ghí and oil-seeds, too, were brought in in larger quantities than last year. On the other hand the imports of timber, which are gradually declining year by year, dropped by over a lakh of maunds. The supplies of spices, fibrous products and hides too, were small as compared with last year. Exports to Nepal show a slight improvement since last year chiefly owing to larger despatches of salt and sugar.

(*b*) *Rail-borne traffic.*—The statistics of this traffic have just been reviewed in detail in the Annual Report on the Inland Trade of the Province. They show how

soon after the famine was over the Province began to recover from the extreme depression which characterised the preceding year.

The bulk of the import trade in 1897-98 fell by 26 per cent., owing entirely to diminished receipts of food grains in consequence of the cessation of the famine; while the export trade rose by 31 per cent., owing mainly to a revival in trade in the agricultural products of the province. Articles like cotton goods, dyes and tans, gunny bags, brass, kerosine oil and spices were imported in much larger quantities than last year. At the same time the exports of wheat and other grains, of hides and skins, of oilseeds, opium, provisions and unrefined sugar rose largely; but those of raw cotton, indigo, shell-lac and saltpetre showed a marked decline.

(*c*) *Road traffic.*—On the completion, on 31st March 1897, of the registration of three years' traffic in the Rohilkhand Division, the staff of the registration establishment was moved, in compliance with the wishes of the Public Works Department, to the districts of the Meerut Division, where statistics are being collected in connection with projected railway lines, and with a view to secure the record of general information regarding the trade and resources of this part of the Province. The statistics of road traffic, too, have just been reviewed in the Annual Trade Report of the Province.

(*d*) *River-borne traffic.*—At the instance of the Director-General of Statistics the question of registering the river-borne traffic of these Provinces with Bengal was taken up last year and proposals were submitted to Government for the registration of this trade. The scheme has met with the approval of the Governments of these Provinces and of Bengal and the registration of the traffic carried between these two provinces on the great waterways of the Ganges, Gogra and Gandak began during the year under report.

(2) *Agricultural Statistics.*—The agricultural returns of these Provinces for 1897-98 have just been submitted to the Statistical Bureau for insertion in the "Agricultural Statistics of British India." Another set of these returns with a detailed review of them will also shortly be forwarded to the Board of Revenue for incorporation in their Revenue Administration Report of the Province. Meanwhile it will be interesting to learn that the cultivated and the cropped areas of the Province, which in 1896-97 dropped by 2,139,984 and 3,229,698 acres respectively, have risen by 2,068,914 and 3,235,042 acres during the year under report; and now closely approximate to the figures of 1895-96. The kharíf area increased by six and the rabí area by 27 lakhs of acres; while the zaid area dropped by 72,639 acres. The favourable character of the season is further indicated by the returns of irrigation, which show that, while in 1897-98 a reduction of twelve lakhs of acres took place in the area irrigated from canals and wells, a corresponding increase occured in the area irrigated from tanks and other sources.

(3) *Reports on Crops.*—Forecast reports on indigo, cotton, *til*, wheat, linseed and rapeseed crops, the monthly report on the agricultural prospects of the season, and the half-yearly reports on the kharíf and rabí harvests of 1897-98 were issued as usual. Crop experiments with the kharíf of 1897 and the rabí of 1898 were made in all districts of the Province under the old rules, and the results are now being tabulated. The recent quinquennial retrospect of our crop-cutting work pointed to the necessity for amending the system under which it was conducted, and a revised set of rules has now been prepared and has met with the approval of Government. Under the new rules, crop-cuttings are to be made in seventeen selected and typical districts and not in all districts of the Province. The system of experimenting and reporting has also been made more precise, and Government has directed that the work be undertaken by a single selected officer in each district, who shall, as far as possible, be relieved of other duties for the time. It may be hoped that the experiments will in future yield results of more assured value.

(4) *Prices and wages return.*—The return of retail prices current, which last year was made a weekly one in consequence of the famine, has since June last again been published every fortnight under the orders of Government. The returns of

retail and wholesale prices and the half-yearly return showing the wages of skilled and unskilled labour were published in the Government Gazette as usual, and copies were furnished to the Statistical Bureau for incorporation in the volume known as "Prices and Wages in India." The instructions issued to districts from time to time regarding the preparation of the return of prices were occasionally overlooked. They were therefore collected and reproduced in a circular which, after having received the approval of the Director-General of Statistics and of the Local Government, was issued to District Officers for future guidance.

(5) *Financial and Commercial Statistics*—The statistics in respect of the mills, factories and other large industries existing in the Province were collected and furnished to the Statistical Bureau for insertion in the "Financial and Commercial Statistics of British India." A circular embodying the instructions issued from time to time in respect of the preparation of the returns of large industries was also issued to District Officers for guidance and facility of reference.

21. **Forestry.**—As stated last year, this Department has very slight concern with forestry. The roadside arboricultural operations for the year have already been reported on in detail. The chief features of the year were the satisfactory management of arboriculture at less cost than in the last year, the transfer of control over Provincial roads from the District Boards to the Public Works Department, and the exclusion of arboricultural estimates from the budget grant of this Department in accordance with the revised scheme of District Board finance. The discussion of the proposal referred to in the last year's report resulted in the establishment of a *babul* reserve in the vicinity of Unao, the development of which will be watched with much interest.

22. Into the realms of meteorology, bacteriology and entomology the Department has been unable to make any excursions. We have been endeavouring to procure for Dr. Lingard more full and accurate intimations of outbreaks of cattle epidemics; and the result has shown itself in the great improvement in the statistics furnished to the Civil Veterinary Department. But, as has often been said, the results of our labours in reporting disease, imperfect though they may be, are far ahead of our means for alleviating it.

## CHAPTER V.

### Scientific and Local inquiry under Provincial direction.

23. The general arrangement of this chapter is the same as in last year's report.

## SECTION A.

### Government Farms.

24. The work done at our headquarters (Cawnpore) Farm, with its appendages,—seed godown, workshop, garden and veterinary hospital—has already been fully reported for the information of Government. It is very briefly epitomised below:—

(*i*) *Experimental Agriculture.*—In the permanent manurial experiment with maize the best outturns, *viz.*, 3,733 and 3,633 pounds per acre, were obtained from plots treated respectively with sheep-dung and sheep-dung plus bone-dust; the cowdung and poudrette plots coming next. These results only confirm the conclusion of previous years, that nitrogenous manures are specially beneficial to maize. The manures which contained smaller quantities of nitrogen gave comparatively low outturns. The unusually high general outturn of the maize crop in the year 1897-98 appears to be due to the adoption during the year of a new method of sowing, which consisted in dibbling the seed (instead of sowing it in the furrow behind the plough) in holes made on regular lines two feet apart from each other, the distance between the holes along the line being one foot. In the permanent manurial experiment with wheat the best outturns were likewise obtained from nitrogenous manures, such as sheep-dung and cow-dung with or without bone-dust and saltpetre; the highest yield being 2,880 pounds per acre.

In the experiment with vegetable and green manures, and the alternation of wheat with leguminous crops, old indigo refuse gave the best outturn as in the past year. Among the green manures, hemp ploughed in produced better results than other manures. In the rotation series, the plots from which a crop of *urd* had been removed gave the highest outturn of wheat. This experiment goes to prove what the theory of agriculture already tells us—that it is better to take a leguminous crop off the ground intended for wheat than to keep it fallow, the root residue of the leguminous crop decidedly enriching the soil. But there are several points of detail for the determination of which the experiments have still to be continued. So far hemp has on the whole proved a more powerful fertiliser than indigo, whether ploughed in or removed before the wheat is sown ; but this is one of the points on which further information is desired. In the experiment in early and late sowing of maize, the early sown plots gave better results, contrary to the results of the past three years, but in accordance with the general experience. It was conclusively proved that, where artificial irrigation was available, early sowing of cotton before the rains was an improvement upon the common practice of sowing cotton after the break of the monsoon. In the experiment with mixed crops the highest return of money value was obtained from sowing arhar in conjunction with juar, as in two previous years.

The results obtained from the permanent experiment with deep and shallow ploughing suggested the conclusion that, unless the land were watered in October before sowing, deep tillage was not altogether profitable in a dry year, as it favoured rapid evaporation of moisture from the seed bed and resulted in comparatively poor germination.

Contrary to the experience of the past year, Canadian oats produced a much higher outturn of grain in proportion to straw than usual. The American rust-proof wheat was tried again and escaped an attack of rust which visited the neighbourhood. The carrot seed received from England in 1896 and stored in airtight chambers was tried in 1897-98 and germinated fairly well. A complete report about the result of trials made with the seed has already been submitted to Government separately.

Among the exotic cottons, some of the American varieties proved to have deteriorated very considerably during the last few years. The produce of the indigenous variety cultivated at the Farm was declared by the experts of the Muir Mills to be superior to the cotton ordinarily grown in the Cawnpore district.

(*ii*) *Distribution of seed.*—The subjoined table compares the quantity of various kinds of seeds distributed during the year under report and the past year :—

| Name of seed. | 1896-97. | 1897-98. | Name of seed. | 1896-97. | 1897-98. |
|---|---|---|---|---|---|
| | lbs. | lbs. | | lbs. | lbs. |
| Wheat ... ... ... | 14,093½ | 161,079 | Masur (Ervum Lens) ... | 55 | ... |
| Barley ... ... ... | 6 | 1,763 | Dhak seed (Butea frondosa) ... | 92 | ... |
| Oats ... ... ... | 2,490 | 10,162¾ | Clover seed ... ... | 2 | 2 |
| Peas ... ... ... | ... | 1,312 | Country gram ... ... | ... | 113 |
| Sorghum ... ... | 24½ | 160 | Indigo ... ... ... | ... | 24½ |
| Guinea grass seed ... ... | 1½ | ... | Gujrati bájrá ... ... | ... | 432½ |
| Lucerne ... ... | 4½ | 71 | Urd (Phaseolus radiatus) ... | ... | 264½ |
| Bájrá (Pennisetum Typhoideum). | 4,515 | 266½ | American cotton ... ... | ... | 70 |
| | | | American maize ... ... | ... | 3½ |
| Paddy ... ... ... | 82 | ... | White gram ... ... | ... | 477½ |
| Arhar (Cajanus Indica) ... | ... | 82 | Tilli (Sesamum indicum) ... | ... | 205 |
| Maize ... ... ... | 7,018 | 12,179¾ | Alsi (Linum usitatissimum) ... | ... | 41 |
| Sáwán (Penicum miliaceum) ... | 3,762 | ... | Sarson (Brassica campestris) ... | ... | 6 |
| Kodon (Paspalum scrobiculatum). | 62,342 | ... | Tobacco seed ... ... | ... | 20½ |
| | | | Mung (Phaseolus mungo) ... | ... | 4 |
| Mandua (Eleusine coracana) ... | 291 | ... | Country cotton seed ... ... | ... | 10 |
| Babul seed (Acacia arabica) ... | 512 | 82 | Rye (Secale cereale) ... ... | ... | 91 |
| Ingadulcis ... ... | 200 | 193 | Potato ... ... ... | ... | 410 |
| Seed canes ... ... | * 5,000 | * 1,400 | Huskless barley ... ... | ... | 82 |
| Poppy seed ... ... | 50 | 22 | Carrot seed ... ... | 140,448 | 66,502 |
| Juar grain (Sorghum Vulgare) | 77½ | 787 | | | |

* Number of canes.

This branch of the Department's business has developed very considerably during the year under report; and it is believed that in this direction the Department is doing good work of permanent value. The wheat figures include a heavy item of 123,000 pounds of white wheat indented for by the Director, Land Records and Agriculture, Burma, for experimental cultivation in the Shan States. But even if this figure were excluded from the account it will appear that nearly 17 tons of perfectly cleaned wheat seed passed into the hands of cultivators against 6·3 tons distributed in the preceding year. Among other agricultural seeds the increase is particularly marked under barley, oats, peas, maize, gram, bajra and urd, owing chiefly to the distribution made through the Special Managers of Court of Wards' estates, who are now in close touch with the Department.

Under the auspices of Mr. Norman Troup, an attempt is being made to introduce improved agricultural seed among the cultivators of the Almora district. Wheat, oats and rye have been sent to Mr. Troup for distribution, and the experiment is being watched with much interest.

The poppy seed was supplied under the orders of the Government of India to the Premier of New South Wales, who required genuine seed of the white variety for experimental purposes. The seed canes were supplied to the Collectors of Mirzapur and Gaya; and the ingadulcis seed chiefly to the Superintendent of the Family Domains of the Mahárája of Benares for cultivation in poor soils.

(*iii*) *Distribution of Implements.*—The following table shows the distribution of implements during the year under report and the past year:—

| Name of implement. | 1897. | | | | 1898. | | | |
|---|---|---|---|---|---|---|---|---|
| | Sold. | Trial. | Hire. | Total. | Sold. | Trial. | Hire. | Total. |
| Ploughs ... ... ... ... | 54 | 14 | 6 | 74 | 207 | 68 | 1 | 276 |
| Chain pumps ... ... ... | 29 | 9 | 5 | 43 | 11 | 3 | 4 | 18 |
| Baldeo water-lift ... ... ... | 1 | ... | ... | 1 | 6 | ... | ... | 6 |
| Chaff-cutters ... ... ... | 9 | 1 | ... | 10 | 12 | 3 | ... | 15 |
| Harrow ... ... ... ... | ... | ... | ... | ... | 1 | ... | ... | 1 |
| Dredgers ... ... ... ... | 1 | 2 | 2 | 5 | ... | ... | 2 | 2 |
| Set of boring tools ... ... ... | ... | 13 | ... | 13 | ... | 13 | ... | 13 |
| Baldeo flour mill ... ... ... | 3 | ... | ... | 3 | ... | ... | ... | ... |
| R. H. kibblers ... ... ... | 3 | ... | ... | 3 | 15 | 1 | ... | 16 |
| Nahan kibbler ... ... ... | 2 | ... | ... | 2 | 5 | ... | ... | 5 |
| Maccaroni press ... ... ... | ... | ... | ... | ... | 4 | ... | ... | 4 |
| Baldeo winnower ... ... ... | ... | ... | ... | ... | 1 | ... | ... | 1 |
| Total ... ... | 102 | 39 | 13 | 154 | 262 | 88 | 7 | 357 |

There has been a particularly marked increase in the sale of ploughs during the year under report, the new form of improved plough, referred to in the last year's report, having attracted special attention at the agricultural fairs. The demand for chain pumps and dredgers was not so brisk during the year under report as in the preceding year of drought. The increase in the sale of other implements is chiefly noticeable against grain kibblers, chaff-cutters and the Baldeo water-lift (for which the Department has now taken out a patent).

With a view to familiarising the cultivators with the actual method of using the improved ploughs, trained ploughmen were specially deputed in the past kharíf season to Bara Banki, where they showed the working of our ploughs with much success; as a result a number of ploughs were bought by the zamíndárs and cultivators of that district. The Assistant Director asks me to acknowledge the valuable assistance rendered to him by Mir Mohamed Hasan, Deputy Collector, Bara Banki, in bringing the ploughs to the prominent notice of the leading zamíndárs of his pargana and in getting them interested in all agricultural matters which the Department is desirous of pushing. The working of the double chain pumps was likewise shown in Muzaffarnagar on occasions other than the annual agricultural fair, and exhibition ploughings were held in the vicinity of Fyzabad.

The popularisation of improved implements necessarily advances slowly, but the endeavour of the Department is to demonstrate to the people the working of the more practical improvements on the indigenous types. The agriculturist may be trusted to appreciate whatever advantages they possess, and to use them if he finds they suit his circumstances.

*(iv) Well-sinking.*—The staff of well-sinkers maintained by the Departnmet during the year consisted of eight men, who carried on their operations in 16 districts, and were busy throughout the year. The total number of trial borings made during the year under report was 131 as compared with 105 in the previous year, showing an appreciable advance in this useful branch of the agricultural work of the Department. Two new sets of boring tools were purchased during the year under report; but the number of applications for the services of well-sinkers was so considerable that, even with more tools in stock than last year, we were unable to meet all the indents on us. The demand for borers is increasing steadily, and it is obvious that zamíndárs are becoming alive to the advantages of taking trial borings prior to sinking wells. If possible, more tools will be purchased in the ensuing year and more men trained to work them. The largest number of trial borings were done in the district of Bulandshahr, where the zamíndárs are especially convinced of the utility of boring operations. The work of the well-sinkers is not confined merely to boring. They are not unfrequently sent out to remove difficulties that arise in the construction of wells or to remedy the failure of old wells to give a sufficient supply of water. The assistance rendered by the Department on such occasions is therefore of great practical value to landholders and is readily recognised as such by them. The total amount spent during the year under report by the Department on well-experiments was Rs. 1,344-1-4, of which Rs. 1,118-9-4 went to cover the cost of new tools. As a rule the wages of the well-sinkers are paid at the rate of Rs. 12 per mensem, besides travelling expenses and freight of tools by the individuals who engage their services; the Department pays only two of them, who are treated as permanent employés for the short intervals during which they are not employed by outsiders. The remaining six well-sinkers are paid by the Department only when they do any work for the benefit of Government. The total sum thus spent on account of the wages of well-sinkers during the year under report amounted to Rs. 72-8-9 against Rs. 51-7-8 incurred in the past year. A sum of Rs. 152-15-3 was spent in wages of labourers, repairs of tools, railway freight of implements and other petty expenses.

*(v) Agricultural shows.*—During the year under report agricultural shows were held at Aligarh, Bulandshahr, Muzaffarnagar, Meerut, Bahraich, Gola (Kheri), Partábgarh and Kakora (Budaun). The first five were attended by the Assistant Director and the last three by other officials of the Department. I was myself present at the Nauchandi fair at Meerut. The work done by the Assistant Director at these shows gives promise of valuable results. He presided over the various agricultural committees at the fairs where he represented the Department and materially assisted them in judging exhibits. He also delivered lectures on agricultural subjects at some of the fairs. The working of improved implements in competition with the agricultural implements of the country was shown to the public at each fair and excited considerable interest. Ploughing matches were held at nearly all the fairs and in these the Watt's plough invariably carried off the first prize. Among the new implements exhibited by the Department, first prizes were awarded to the "Meston" plough and the "Baldeo" water-lift at several of the shows. The little German fruit evaporator attracted much attention everywhere, the process of desiccating fruits having been exhibited in actual practice. The suggestions made by the Assistant Director last year regarding improvements in the classification of samples of agricultural produce and in the general managemnnt of the agriculture sections of the show were duly carried into effect at Bulandshahr and suggestions for further improvements were made by him which, it is hoped, will be given effect to next year.

A large number of improved implements were sold at Bulandshahr, Meerut and Bahraich shows. Among the agricultural implements exhibited by native inventors, besides those patronised by the Agricultural Department, the "Babu sugarcane mill," patented by Bhawani Das of Bijnor, was found to be capable of extracting a very high percentage of juice from sugarcane. Samples of agricultural produce which had won prizes in different shows were collected by the Assistant Director and sent to the Cawnpore Farm to be kept in the show room. Samples of raw sugar made by the Assistant Director by an improved method were again successfully exhibited at several fairs and adjudged superior to the sugars made by native manufacturers. Baldeo, the head mechanic of the workshop attached to the Experimental Farm, Cawnpore, was in some of the shows handsomely rewarded for his labours in inventing simple agricultural appliances of practical utility and won a silver medal besides a prize of Rs. 32 at Bahraich.

(*vi*). *Cattle-breeding.*—A few bulls representing the leading breeds in the Provinces are usually kept at the Cawnpore Farm for breeding purposes, and their services are utilized to a large extent by cattle breeders, cultivators and citizens of Cawnpore and its neighbourhood. During the year under report 72 cows were covered, out of which 40 are reported to have calved, 12 were served unsuccessfully, 8 died and in the remaining cases the result is unknown. Some of the Managers of Court of Wards in the United Provinces have directed their attention lately to the importance of improving the local strains in their estates. During the year under report six bulls were supplied to the Partábgarh, one to the Bara Banki and one to the Sitapur Court of Wards' estates. An indent for bulls was also received from the Special Manager of Gorakhpur towards the close of the year and complied with in October last. One bull belonging to the Farm was lent to Mr. Abbott of the Jhánsi Grass Farm for a year, to encourage him in a project of starting a stock farm on the great grazing wastes near the Jhánsi city.

## SECTION B.—Private Farms.

25. **On Court of Wards' Estates.**—Up to the time of going to press I have received only 36 district reports on agricultural work in Court of Wards' estates. In 20 of the districts where properties are under Court of Wards' management, little or nothing has been done towards improved stock-breeding or cultivation: the reason usually being the smallness of the estates or the burden of debt on them. In 12 districts more or less useful work has been done. Experiments with improved varieties of field staples were conducted in the Court of Wards' estates in Etáwah, Lalitpur, Mirzapur, Gházipur, Unao, Kheri and Bara Banki. They chiefly consisted in the introduction of Jaunpur maize, Muzaffarnagar wheat, Kabuli gram, Gujrati bájra and Poona sugarcane. Plantation of dhák and babul was carried on to some extent in the Court of Wards' estates in Budaun and Mirzapur, and in the Holapur estate in Allahabad some efforts were made to reclaim úsar. A number of improved agricultural implements were purchased and tried during the year by the various estates in Gházipur, Kheri and Bara Banki. By way of improvement in stock-breeding, four bulls were purchased during the year by the Rámnagar estate in Bara Banki, and one bull and one Arab pony stallion by the Anapur estate in Gházipur. The latter estate also purchased two cows and 10 heifers for distribution among tenants.

Since the year closed a very successful meeting of Court of Wards Managers has been held at Cawnpore, and arrangements have been made for extending and strengthening the connection of the Department with the management of some of the more important estates

26. **Managed by private individuals.**—(1) *The Meerut Demonstration Farm.*—This farm can no longer come strictly within the category of private management, as the control of it was taken over by the District Board of Meerut at the commencement of the current financial year. The cost of the maintenance of the farm is met from its receipts and a subsidy of Rs. 1,000 per annum contributed by the District Board, the Department of

Agriculture providing a trained Superintendent paid from the Budget of the Cawnpore Farm. During the year under report a contribution of Rs. 70 was made by Lála Jainti Prasad, a member of the District Board, for purchase of fodder for cattle. The finances are controlled, under the supervision of the Collector, by a sub-committee consisting of the Tahsíldár of Meerut and two non-official members; the agricultural work being regulated according to the advice of this Department. The present area under cultivation is about 150 acres. Part of the area is irrigated from the canal and part from wells. On one of the wells an Aërmotor imported from Chicago was set up during the year under report and has been of great service to the Farm. A detailed report on its working has been separately submitted to Government. The effects of sewage water and of liquid manure on cereal crops were again succesfully demonstrated during the year. In the experiment with sowing different weights of wheat seed ranging from 60lbs. to 120lbs. per acre, the highest outturn was obtained from the plot which received 100lbs. of seed. Fifty pounds per acre of oat seed gave better results than 60lbs. and poorer than 40lbs. per acre. Sheep-dung produced excellent manurial effects on wheat, as at Cawnpore. A programme of work to be carried out during the current rabi season has been drawn up by the Assistant Director. That officer visited the farm twice during the year, and the Director once. The Farm also keeps a small stud, consisting of an Arab horse stallion, a Hissar bull, two donkey stallions and one Kashmír goat. The services of all these animals are appreciated and fully utilized by the breeders of the Farm neighbourhood. The total receipts from various heads and the expenditure during the year under report were Rs. 2,906-13-6 and Rs. 2,731-5-9, respectively, showing a saving of Rs. 175-7-9. With the very heavy subsidy that enters into the receipts, the Farm cannot have much demonstrative value. It has had, however, to be worked with practically no capital since Mr. Wyer left Meerut; and for a year or two, some money must be sunk in it before its efficiency can be assured. Thereafter we hope it will be possible to dispense with the District Board's subsidy and to show a healthy unaided balance-sheet.

The Farm, it ought to be noted, has been used with much success as a centre for the distribution of improved seed.

(2) *The Lyall Farm at Ujhauli*, near Budaun, has ceased to exist as an experimental station, owing to the death of its owner, Chaudhri Said-ud-din Husain. His son and heir cares for none of those things.

(3) *Jatau Farm.*—This farm belongs to Kunwar Karan Singh, an intelligent zamíndár of the Agra district, and extends over an area of 70 acres. The land is mainly worked with improved agricultural implements manufactured at the Cawnpore Farm. Of the different foreign and indigenous varieties of wheat tried at the Farm, Muzaffarnagar wheat is reported to have given the largest yield. This variety is largely distributed by the proprietor to the cultivators for seed purposes. Several manures were tried on wheat during the year under report, sheep-dung giving the best results. Six varieties of juár were tested during the year, of which three varieties—*viz. Jogia, Bánsmati* and *Safeda*—are said to have given the best outturns. A small quantity of Bánsmati juár was furnished by the proprietor to be sent as a sample to the Reporter on Economic Products.

## SECTION C.—Agricultural Associations.

27. (1) *The Provincial Agricultural Association.*—It was not considered advisable to call a general meeting of the Provincial Agricultural Association during the year under report, but a small conference of selected zamíndárs and managers of private estates of the United Provinces was arranged for on the 22nd and 23rd of April 1898 at the Cawnpore Farm, as proposed in paragraph 29 of the last year's report. Among the gentlemen who attended were Rae Bahádur Chaudhri Debi Singh of Meerut, Kunwar Karan Singh of Agra and Mr. Owens, the Manager of the Kotla estate. The working of the improved implements, the samples of fine staples produced and the experiments conducted at the Cawnpore Farm were shown and explained to these gentlemen by the Assistant Director and myself. They were

also taken round the úsar reserve at Juhi, where experiments in reclamation of waste land by deep tillage and growing trees were fully explained to them. It is intended to continue these small friendly gatherings, as they do a great deal more good than large and voluble, but impractical, meetings of the Provincial Association.

(2) *The Porter Association* of Baraun in Allahabad does not appear to have held any meeting during the year under report. Referring to the agricultural work done by the Association during the year, Rae Bahádur Thákur Mahabir Prasad Narain Singh, the Secretary to the Association, reports that he distributed a considerable quantity of seed to the cultivators of his estate and that Muzaffarnagar wheat was sown extensively with successful results. Certain experiments, of no special importance, with different sorts of manures, are also reported to have been carried out by the Secretary. Farukhabad potatoes were introduced recently with considerable success.

(3) *The Bijnor Agricultural Society* has sent in no report and has apparently done no special work.

## SECTION D.—Special inquiry into agricultural defects.

28. As explained last year, the agricultural defect that has occupied the attention of the Department in these Provinces for many years is úsar or land infected with injurious salts. The experiments in utilizing such land are chiefly concentrated in three úsar reserves, at Juhi near Cawnpore, at Gursikran near Aligarh and at Abbaspur near Unao. The Chherat reserve may be left out of consideration, as it is wholly leased to Mr. Keventer, who utilizes it entirely for grazing purposes and cultivation. The following account of these reserves has been written by Saiyid Muhammad Hadi, who has been in direct control of them throughout the year, and whose enthusiasm in the subject has already led to well-deserved success in several of the methods of reclamation adopted by him.

(1) *Juhi.*—The Juhi plain, 102 acres in area, situated five miles south of Cawnpore, has been under observation since 1882, and is maintained chiefly as a fuel and fodder reserve, a small portion of it being also devoted to experiments in reclamation by deep tillage, manuring and irrigation. The barrenness of the land was originally due in part to the presence therein of injurious efflorescent salt and partly to the great compactness of the soil. As an effect of enclosure and embankment, prohibition of grazing and stagnation of water on the land during the rains, the soil improved slowly in condition, natural vegetation sprung up and the salts gradually disappeared. The prevalent grass growing naturally on the úsar is still the typical *úsrahi* known as *Sporabolus pallidus;* but by artificial sowings better grasses, such as *Chloris tetrastachya, Andropogan annulatus, Cynodon dactylon* and *Iseilema wightii,* have been made to establish themselves and are ousting the inferior *Sporabolus.* The rainfall during the year under report was a little above normal, and the season very favourable generally. Consequently the growth of the grasses was particulary luxuriant and the unusually high outturn of 36 to 40 maunds per acre of hay, by no means inferior in quality, was obtained from the best plots. *Sorghum impi,* sown for fodder on manured land broken three years ago, yielded two cuttings during the year, the total outturn of green stalks being 264 maunds per acre.

The land reclaimed by deep tillage and manuring has proved during the year to be quite capable of yielding fair crops of rice, *arhar,* hemp and wheat. It was found that mixing sand (an expensive treatment at this reserve) with the hard clay soil appeared to improve the fertility of the latter.

The subject of propagating trees on poor lands has been studied with special care during the past four years at this reserve, by means of practical experiments in various methods of sowing and planting different kinds of trees. Sowing babul (*Acacia arabica*) and dhák (*Butea frondosa*) seeds broadcast or in furrows behind the plough has so far given very unfavourable results, even where deep tillage, manuring and irrigation were resorted to and most cautious measures taken to foster the young plants in the early stages of growth. Under these conditions the seed

germinated very well; but the seedlings mostly died out in course of a few months or were stunted in growth. Sowing seed on ridges 1½ to two feet high, though not equally unsuccessful, has appeared to be an operation far from promising. Planting seedlings or sowing seeds in holes (thálas) one to two feet deep filled even with good earth and manure has repeatedly proved a failure; but a method hereafter referred to as the "deep thála system" has been attended with marked success so far. It consists in digging holes about four feet deep and three feet in diameter, filling them in with comparatively good earth (taken from slightly better patches of ground not uncommonly found in úsar blocks) with or without manure, raising in a conical shape the surface of the thálas about 1½ to 2½ feet above the level of the surrounding land, and then planting a seedling or sowing seeds on the top of the stool. The secret of success in this mode of raising trees seems to lie in the piercing of the hard bed of kankar or clay about six to eight inches thick, which occurs at a depth of two to three feet below the surface and interferes with the normal development of roots and the diffusion into the lower strata of the injurious salts. Under this system 75 trees of *babul* (*Acacia arabica*), *shisham* (*Dalbergia sissu*), *ber* (*zizyphus jujuba*), *nim* (*Melia indica*) and *dhák* (*Butea frondosa*) were planted last year in one of the *worst* plots on the úsar in thálas filled with comparatively good earth. Their progress during the year has been remarkably satisfactory, indeed much more so than was expected; some of them having attained a height of over six feet. It is gratifying to observe that *not a single death has occurred* among these trees. Thirty trees of the same kinds were planted last year in deep thálas refilled with the earth that was dug out. Among these 10 per cent. (not a high figure) died during the year; and to take their place fresh seedlings had to be put in. It will thus be seen that the mere breaking up of the hard pan brings about a condition moderately favourable for growth of plants in úsar lands. A large number of guava, mango and jaman trees planted likewise in the past years are doing very well, and the block devoted to the cultivation of these plants is assuming the appearance of an attractive orchard.

During the year under report 210 thálas have been sown and planted under the "deep thála system" with different kinds of seeds and seedlings, all of which are in very good condition, the new plants introduced in the year being Eucalyptus and *mahua* (*Bassia latifolia*), both recommended by the Director of the Botanical Department, Northern India. The Department takes a keen interest in these experiments and their progress is being watched with considerable care.

The tanning trees reported in former years are growing in a perfectly healthy manner. The progress of the date palms, however, is slow. The receipts and expenditure of the úsar amounted during the year to Rs. 28-2-6 and Rs. 969-2-9 respectively.

(2) *Gursikran.*—The úsar reserves at Gursikran, comprising an area of about 960 acres, acquired under the Land Acquisition Act in 1885, is situated in the district of Aligarh. Here the soil is of two different classes, namely, (1) a hard tenacious clay slightly infected with *reh*, on which the grasses known as gandar (*Antistheria prostrata*) and dáb (*Eragrostis cynosuroides*), grow abundantly under natural conditions; and (2) the typical *úsar* soil, highly charged with alkaline salts injurious to vegetation. The top layer in this case is loose in texture, the sub-soil is a kind of hard clay less impregnated with salts and the stratum below is either a hard pan of kankar or a stiff clay interspersed with nodules of kankar difficult to dig. The soil mentioned first admits of reclamation by deep ploughing, breaking of clods, irrigation and manuring. A considerable area has been broken and rendered fit for cultivation of ordinary staples by means of these processes. It was cultivated until the past rabi season chiefly by a caste of people known as *Aherias* (notorious in some districts as habitual offenders), who were allowed to settle at the reserve in order to provide labour and in the hope that they would mend their ways under the surveillance of this Department and gradually take to agriculture and other respectable modes of living. Some of these men having been suspected lately of being concerned in criminal offences, it was considered inadvisable to keep them any longer under

our protection, and the whole settlement was compelled, in consultation with the District Magistrate in April last, to leave the place. The area cultivated by them amounted to nearly 78 acres, paying an annual rental of Rs. 469-4-0, which has since been let to cultivators of Gursikran at a total rent of Rs. 474-3-0. Nineteen acres are cultivated under direct management, chiefly with wheat and fodders. The highest outturn of wheat during the year under report amounted to 14·8 maunds per acre. Among the fodder crops successfully raised were oats, mustard, sorghum and khurti (*Cyamopsis psoralioides*), all used for feeding the stock kept at the reserve. European carrots were also grown in several plots, the highest yield being nearly 112 maunds of roots per acre.

Reclamation of the second class of úsar land above mentioned has proved a more troublesome and tedious matter. The effects of enclosure, embankment, exclusion of grazing cattle and retention of rain water have gradually led to the establishment of permanent grass vegetation on the land, the predominant grass being *Sporabolus pallidus*. Superior grasses have been introduced by artificial sowing and are gradually spreading themselves. Of the various grasses tried, one locally known as *bat* (*Diplachne fusca*) a semi-aquatic grass much relished by cattle, has produced a remarkable change in the condition of the surface soil, where the ground has been sufficiently moist to admit of its successful growth. The cultivation of this grass has been extended during this year. Of 12 grasses obtained from Australia and New South Wales and supposed to be suitable for cultivation on poor soils, only one (*Eragrostis fulcata* or the fulcate love grass) thrived in pot cultivation but not on the open ground, the plants having both flowered and seeded; the earth used in the pot being a mixture of the surface (reh) soil and the subsoil (clay). Grass has been cut recently for making hay, which is required in considerable quantities by the Collector of Aligarh for use in the cavalry camp in his district in the current cold season. The yield of hay per acre amounted to 10·3 maunds. Attempts to grow babul and dhák from sowing seed broadcast or on ridges in absolute úsar or land previously ploughed, manured and watered, have ended in failure, as reported in previous years, except in patches comparatively free from injurious salts. Trees planted in shallow thálas by the ordinary method have persistently refused to grow; but those planted in 1895-96 and 1896-97, under the "deep thála system" described in detail in the section relating to Juhi, have been growing remarkably well even on the worst patches. The earth used for filling in these thálas was taken from slightly better patches occurring on the úsar plain. In the past year 400 trees of babul, nim, ber and shisham were planted under the "deep thála system," the thálas having been refilled with the earth and kankar dug up in making the holes. Altogether 88 deaths occurred in this plantation during the course of the year. The percentage of casualties here was by no means high, considering that the land was of the *worst* class of úsar, that good earth was not used for filling the thálas, that some of the seedlings were weakly at the outset, and that shisham and babul are naturally very susceptible to extremes of temperature which characterized the climate of the locality. The remaining 312 trees are making very satisfactory progrees, which is not the case with trees grown by other methods. Thus the results so far go to prove the success and superiority of the "deep thála system." During the year under report 388 trees of different kinds have been planted and sown under this system in holes filled with imported earth and with úsar soil in order to compare results. The new kinds introduced are amaltás (*Cassia fistula*), mahua (*Bassia latifolia*), mangoes, lemons, oranges and eucalyptus. Jhau (*Tamarix gallica*) trees planted in former years are all in a healthy condition, and 200 new trees have been planted during the year. Farash (*Tamarix articulata*) which had never thrived before has been propagated from cuttings with much success during the year under the "deep thála system." The guava plantation has been further extended.

The application of gypsum referred to in the past year's report as a measure for reclamation of úsar land by chemical treatment has not yet effected any apparent

improvement in the soil. The date palms are progressing slowly. One of them flowered and bore this year, but the fruits dried up before maturity. The jait (*Sesbania ægyptiaca*) trees planted in former years are all doing well.

Experiments in ensilage were continued; the best quality of silage was, as before, obtained by mixing chopped juár with úsar grass before pitting it in the silo.

In Dr. Leather's experiment to determine the weight of dung obtained in a year from (*a*) a pair of bullocks fed on grass and straw only, and (*b*) a pair to which five pounds of oilcake per diem were given in addition, the following results were obtained :—

| | Pair (*a*). | | | Pair (*b*). | | |
|---|---|---|---|---|---|---|
| | Mds. | s. | c. | Mds. | s. | c. |
| Total weight of fresh dung during the year ... | 157 | 37 | 0 | 115 | 38 | 0 |
| Total weight of the dung at the end of the year, *i.e.* when converted into manure after fermentation. | 56 | 2 | 0 | 48 | 5 | 0 |
| Total weight of fresh litter applied during the year ... | 50 | 33 | 0 | 44 | 19 | 0 |
| Total weight of litter at the end of the year when converted into manure. | 44 | 0 | 0 | 40 | 8 | 0 |

The receipts of the reserve during the year amounted to Rs. 1,213-8-0 and the expenditure to Rs. 2,501-12-6.

(3) *Abbaspur úsar reserve.*—In July 1897 Messrs. Cooper, Allen & Co. of Cawnpore submitted to Government for consideration a proposal for the creation, at public expense, of babul plantations on a large scale on blocks of úsar land in the Etáwah district. The object of the plantations would be to supply the Government factory with tanning materials, which the firm offered to buy in very considerable quantities at a reasonable price. This Department was asked by Government to furnish an opinion as to the practicability of the scheme. After consultation with the Collector of Etáwah district it was suggested that the ultimate verdict on the feasibility of the scheme upon the large scale contemplated by Messrs. Cooper, Allen & Co. must rest with the Inspector-General of Forests; but the permission of Government was asked to the conduct of experiments on a small scale which might help the Forest authorities in their final decision. Proposals, framed after examination of several úsar blocks in certain parts of Oudh, were submitted for the formation of a babul reserve three miles west of Unao in villages Saida, Abbaspur and Dostinagar, which appeared a suitable locality on account of its nearness to Cawnpore, the consequent facility of efficient supervision of operations by the officers of this Department, and the cheap cost of importing the bark into Cawnpore. Permission to start the experiment on a small scale was accorded; but the Government was unable to make an additional grant for it. These orders arrived rather late in the planting season. Meanwhile arrangements had been made with the Deputy Commissioner of Unao to get the land required for the experiment, as soon as the orders should come; and no time was consequently lost in starting the operations. From the middle of August to the 20th of October last, 10 acres, containing 1,416 thálas, were sown and planted with babul seeds and seedlings according to the "deep thála system" and in two acres hurriedly broken with the plough the seed was sown broadcast. The young trees in thálas promise as successful results as have been achieved so far at Juhi and Gursikran under the "deep thála system"; but it is too early to discuss the merits of broadcast sowing. *Kachcha* wells have been dug at convenient places in the plantation to provide irrigation during the dry season. The land of this new reserve, though not of the very worst type, is a very fair specimen of the reh-infected úsar commonly occurring in different districts of Oudh. Arrangements for a sale-deed of the land (altogether about 88 acres) taken up, executed, in communication with the District Officer, by the proprietors in favour of the Secretary of State, are in progress. The total cost incurred in the operations up to the end of October amounted to Rs. 694-14-9 which was met by curtailing expenditure under other reserves.

Arrangements will soon be made for the transfer of funds from other heads of the Department's budget in order to meet the further expenses of the new plantation during the remainder of the current financial year.

(4) *Amramau.*—The Department has continued to keep an eye on the úsar plain at Amramau, which was sold after reclamation, in 1892. The land has been bought recently in public auction by one Balmukand, a military officer under the Mahárája of Indore, and he seems to be making some feeble efforts to restore it to the improved condition in which it left the hands of this Department.

In the past rabi and kharíf seasons, the produce was very poor on account of careless cultivation. The rabi crops now on the ground, chiefly gram and mustard, are not bad; but the means of irrigation, which forms an important factor of success in dealing with úsar lands, are extremely limited, and nothing seems to have been done so far to supply the want. A considerable portion of the area which used to be cultivated before the úsar was sold by this Department is still lying fallow. The new proprietor is endeavouring to plant fruit and timber trees under the ordinary cultivator's method, which is likely to result in a failure. He cannot expect to work the land profitably on principle of arable farming until he improves the sources of irrigation and sinks some capital on manuring and deep tillage. With the limited supply of water at present at his disposal, he could not perhaps do better than plant it up with fruit trees under the "deep thála system."

## SECTION E.—Government Gardens and Miscellaneous.

29. The Botanical Gardens at Saháranpur and the Horticultural Gardens at Lucknow are entirely under the control of this Department, each of them having as Superintendent a trained European gardener. The Muktesar orchard in Kumaun is under the control of the Commissioner of that Division; but its budget and annual report pass through this Department, which is also frequently consulted as to the working of the orchard. The Khusru Gardens at Allahabad and the Táj Gardens at Agra are under the local authorities; the Director is associated in their management, and is the channel for the submission of their annual reports to Government, but his connection with them is almost entirely consultative. The first three gardens carry work of agricultural interest and importance; the last two are mainly ornamental in purpose.

(*a*) *Saháranpur Garden.*—The season, though on the whole dry, was a fairly favourable one. A number of instructive experiments of economic value were tried; but the results obtained were, with few exceptions, negative. Among orchard experiments the introduction of Rohilkhand mangoes and the successful grafting of good pears on the ordinary country *naspatí* were interesting. In the distribution of seeds, plants and shrubs, the garden did a steadily increasing business and the Military Department were provided with a considerable stock of drugs, chiefly colocynth, taraxacum and hyoscyamus. The expenditure for the year amounted to Rs. 24,677-11-6 and the total direct and indirect receipts to Rs. 25,106-15-4.

(*b*) *Lucknow Garden.*—The year was a dry one, the rains having come late and closed early, and the total rainfall having been light. The fruit crop accordingly suffered severely, the orange and citron trees giving practically no yield. The distribution of fruit trees, shrubs, plants and seeds, though not without fluctuations in detail, advanced steadily. Experiments with Egyptian cotton and Arabian date palm proved a failure, the latter giving next to no yield of fruit. The financial results of the garden were satisfactory, the cash income being Rs. 14,333-8-5, or allowing for the value of gratis issue, Rs. 14,484-11-9. The expenditure was Rs. 16,661-13-2.

(*c*) *Muktesar Orchard, Kumaun.*—The orchard suffered severely from drought, cyclonic storms and landslips. The experiments with clovers and oats proved a

failure, and the yield of potato was also below that of the last year. The receipts, however, rose to Rs. 1,307 against Rs. 1,025, and were chiefly due to the larger sale of fruits. The expenditure during the year amounted to Rs. 2,693 as compared with Rs. 2,567 in the last year. The office of Superintendent fell vacant during the year, and it was filled up by the temporary appointment of Mr. Sturt. The institution hardly fulfils the object for which it is started ; and a suggestion by Sir Edward Buck, who visited it last February, that it should be given up as an experiment station has met with the approval of the local authorities, by whom, it is understood, definite proposals are being submitted on the subject to Government.

(*d*) *Khusru Garden, Allahabad, and* (*e*) *Táj Garden, Agra.*—No specially original or experimental work was carried out during the year at either of these gardens. The Khusru Garden lost its Superintendent, Mr. Phillips, by retirement: he has been replaced by Mr. Davies, a trained Kew gardener, under whom improvement may be hoped for.

30. *Dairies.*—Dairy experiments are now left entirely to private industry, and the sale of our Chherat farm to Mr. Keventer is now on the eve of being concluded.

31. *Preservation of fruit and vegetables by evaporation.*—Allusion was made in last year's report to a cheap German fruit-evaporator as having been tried at the Cawnpore Farm for desiccating fresh fruit. Further trials were made during the year under report, with, however, no satisfactory results, the products obtained being inferior in quality. In the present form of the evaporator, it is very difficult for native manufacturers to regulate the heat so carefully as to prevent some of the fruits from being burned. The cost of fuel required is heavy ; and some fruits, especially ripe mangoes, do not keep more than a few days after drying. The larger evaporator at Saháranpur has done little work, as it is clearly impossible to work fruit evaporation successfully otherwise than on a fairly large scale.

32. *Lucknow Museum.*—The museum collections were enriched during the year by 1,151 specimens. Coins, pictures, manuscripts and zoological specimens formed the most important additions. The Reference Library continued to grow, and had about 1,509 readers in the year. Visitors to the Museum proper averaged 440 daily.

The new Artware sale depôt has begun well, and will no doubt be appreciated by the public as it gets better known ; but Government has decided to let its working develope for some time before extending the system of public sale-rooms to other centres of art industry in the Provinces.

## CHAPTER VI.

### Agricultural Education.

33. On this subject there is very little to add to the general review of the situation that was attempted in last year's report. The Department has had no direct concern with any fresh movements in the direction of agricultural education; and the only matter that need be here referred to is the progress of the Cawnpore Agricultural School.

34. **Agricultural School.**—A detailed report on the working of the Agricultural School was submitted to the Director of Public Instruction in May last. The staff of the school during the year under report consisted of a Principal and two Assistant Masters. Mr. P. V. Subbiah, the Principal, has been on sick leave since 8th February last, M. Ali Husain, the 1st Assistant Master, officiating for him. The 2nd Assistant Master, a passed student of the Baroda Agricultural College, has been acting in place of M. Ali Husain; and an undergraduate of the Panjáb University, who is also a trained teacher of the Central Training College, Lahore, as 2nd Assistant Master. The full course of the school extends over two years and the subjects taught are Agriculture (theory and practice), Physiography, Chemistry (theoretical and practical), Botany, Surveying (theory and practice), Elementary Physics and duties of Patwáris and Kanungos (for candidates for kanungoship). Provision has been made to teach about 30 students. The Boarding-house attached to the school affords accommodation for 18 students ; but measures have been taken to extend the building. Eight scholarships

of Rs. 5 a month each, tenable for two years, are given by Government. The new batch of students admitted during the year under report consists of 16 lads, seven of whom are Muhammadans and nine are Hindus. With the exception of one student, who intends to qualify as a teacher of agriculture, all are candidates for kanungoship nominated by District Officers. The new class on the whole is superior in point of education to any admitted in former years, none of its members having passed a lower examination than the Entrance or the School Final. The final examination of the 2nd year class students was held in April last. Pandit Sri Lal, C.S.,M.R.A.C.; Mr. E. G. Hill, B.A., Professor of Natural Science in the Muir Central College, Allahabad; Mr. J. F. Duthie, F.L.S., Director, Botanical Department, Northern India; and Mr. C. H. G. Johnson, Assistant Superintendent of Land Records Surveys were examiners in Agriculture, General Chemistry, Botany and Surveying respectively: the *vivâ voce* examination in General Chemistry and Botany and examinations in practical Agriculture and Agricultural and Analytical Chemistry being held by the Assistant Director of this Department and in Gymnastics and riding by myself.

Out of 17 students who appeared at the Final examination, 14 passed, 1 being placed in the 1st Division and the rest in the 2nd Division. Thirteen students appeared at the School Final examination of the Allahabad University in the optional subjects of (*a*) Agriculture with surveying and (*b*) Elementary Physics and Chemistry; of these 10 passed in the former and all in the latter subjects. The outdoor and practical training, including plot cultivation and field work, has been maintained by the students. Of 13 students of the 2nd year class sent to Aonla in Bareilly to be trained in practical surveying, 12 were awarded certificates by Mr. G. B. Scott, Superintendent, Land Records Surveys, and one failed on account of ill health. The 1st year students have since the close of the year been deputed to Farukhabad to learn practical survey with the survey party working in that district. The two horses of the students' riding club referred to in the last year's report have been replaced by two animals of a better stamp, and arrangements made to have the boys trained in riding by a proper instructor.

The lawn tennis and foot ball clubs have been working well. A very considerable portion of the expenses of these clubs is met by the students themselves.

An agricultural association, which has for its object the occasional discussion of agricultural matters and a small reading club which subscribes to a number of newspapers, are also maintained by the students at their private expense. A number of lectures on the science and practice of photography have been delivered lately by the Assistant Director, and some of the students are now capable of producing photographs which would do credit to the amateur beginner. The majority of the passed students have succeeded in securing posts of Kanungos or Assistant Kanungos. In the Court of Wards' estates, however, which ought to provide much scope for the use of their agricultural knowledge, only three of the passed students have so far succeeded in securing appointments. Four students are employed in native states.

The question of sending young zamíndárs who are under the Court of Wards to be trained at the school has hung fire owing to the want of sufficient boarding accommodation. Projects have been submitted to Government for adding a new wing to the boarding-house; and it is hoped the agricultural education of wards will soon become practically available.

35. **The Vernacular Agricultural Journal.**—This organ is intended mainly for the dissemination of useful agricultural information. The subscription to the journal, including postage, is 14 annas a year for the people of these Provinces, and Re. 1-6-0 for outsiders. Among other Provinces the zamíndár and landholders of the Panjáb appear to recognize the value of the paper in a particularly marked degree, and the number of subscribers from that Province is increasing steadily. The journal is published monthly and contains 20 pages of readable agricultural matter, chiefly consisting of translations of the writings of the Assistant Director of these Provinces, and of selections from the bulletins and other agricultural publications

received in this Department. Not less than three pages are usually devoted to an account of the agricultural experiments carried on at the Cawnpore Farm. The notes published in the journal are not unfrequently copied by other Urdu papers. Towards the close of the year under report 276 copies were issued to subscribers, against 268 issued last year at the corresponding period, showing a small increase in circulation. In order to avoid troublesome correspondence with subscribers, the rule regarding payment of the subscription in advance is rigidly enforced, though it unfortunately tends to prevent any rapid improvement in the circulation. It is proposed to slightly relax the rule hereafter, in the hope that increased circulation may thereby be secured.

The total receipts from subscription during the year under report amounted to Rs. 169-8-0 as against Rs. 143-3-6, the increase being mainly due to a larger sale of back numbers of the journal during the year. The expenditure as usual was Rs. 360, exclusive of postal charges. The journal has recently been registered as a periodical under the new Post Office rules issued by the Government of India, and this measure will greatly reduce the expenditure on postage.

## CHAPTER VII.

### Publication of agricultural information.

36. The annual reports of District Officers as to the utilization of their pargana-books for the detection of the occurrence and causes of agricultural deterioration will be separately digested for submission to the Board of Revenue. Meanwhile the reports for three years back are being examined and analyzed for the double purpose of making a permanent record of the agricultural condition of each district, and of ascertaining definitely the lines on which such reports should be drawn up in future. A beginning is thus being made with the manual of the agricultural circumstances of each district, which it is the wish of His Honor the Lieutenant-Governor that this Department should in time compile. Up to the present we have not reached the stage of publication: we have much material to collect and to supplement; and the subject will require to be worked at for some-time to come.

37. The system of "ledgering" information in this office is also being worked out in detail, in accordance with the general outlines of the scheme laid down by the Government of India. A system seems to have been in force in the office some years past, and steps are now being taken to bring it up to date and to recast it.

38. A piece of special work connected with the present position and needs of the sugarcane industry has been engaging the attention of the Assistant Director for some time past. During the cold weather of 1897-98 he conducted an inquiry into the varieties of sugarcane grown in the Meerut Division and in certain districts of Oudh. The information obtained is likely to be useful, but further inquiry must be made and the varieties cultivated in other tracts examined before the information can be compiled in a form suitable for publication. Saiyid Muhammad Hadi has been asked to go into the subject thoroughly and try to complete the inquiry during the ensuing cold weather. During the summer he enquired into the condition of the sugar trade and drew up a long note which is now in my hands. He believes that foreign refined sugars, namely, the beet-root sugar imported from Europe and the cane sugar from Mauritius, are rapidly replacing the country refined sugar (*khand* or *chini*), and states with authority that a very considerable portion of the sugar used by the native confectioners in some of the large cities, notably Lucknow and Cawnpore, is now of foreign origin. The demand for Rohilkhand sugars in the Panjáb, which was the chief market for them, has fallen very considerably because of the advent of foreign sugars in that province. Beet-sugar is also gaining favour with the native consumers in the United Provinces other than the Halwáis. There has been a marked fall in the prices of native refined sugars, and the native refining industry would consequently appear to be threatened with serious deterioration.

39. No paper was communicated to the Ledger during the year by or through the agency of this Department. The publication of a note on the experimental

cultivation of European carrots at the Cawnpore Farm and one on the degree of success attained in the various districts of the United Provinces in the cultivation of these carrots was under the consideration of this Department. But our intentions have been forestalled by the Reporter on Economic Products, who has published the correspondence on the subject in the Agricultural Ledger (No. 12 of 1898).

## CHAPTER VIII.

### FINAL.

40. No orders have yet been received as to the procedure by which the connection between this Department and the Registration Department is to be strengthened. During the year we received no communications from the latter Department other than the usual copies of its annual report.

41. I have compiled this report in somewhat of a hurry, as I am proceeding on leave in a few days; so I have to apologize for the summary references to many matters that deserve fuller discussion.

In conclusion I would submit, for the favourable notice of Government, the good work done during the year by my Personal Assistant, Mír Saiyid Husain. His duties have been onerous and responsible; but he has fulfilled them with ability and marked punctuality. The Head Clerks of the Land Records and Agricultural Sections—Bábu Prag Das and Munshi Mashuq Ali, B.A.—have given full satisfaction; and the duties of Farm Office Munsarim have been very efficiently conducted by Munshi Ali Sajjad, B.A.

As last year, I would again venture in this place to commend to the approbation of Government the industry, zeal and skill displayed by the Survey Officers in these Provinces. Without exception they have laboured hard and turned out good work.

I have the honour to be,
SIR,
Your most obedient servant,
J. S. MESTON,
*Director.*

# APPENDIX

*Statement showing the receipts and expenditure of the Department of Land Records and Agriculture, North-Western Provinces and Oudh, for the financial year* 1897-98.

| Heads of receipts and charges. | Budget estimate. | Actual. | Savings. | Remarks. |
|---|---|---|---|---|
| RECEIPTS. | Rs. a. p. | Rs. a. p. | Rs. a. p. | |
| *Miscellaneous (Provincial) Scientific and other Minor receipts.* | | | | |
| Agricultural Department ... ... ... | 300 0 0 | 213 2 3 | ... | |
| *Experimental Farms and Factories.* | | | | |
| Experimental Farm ... ... ... | 4,100 0 0 | 2,174 1 9 | ... | |
| Workshop and well experiments ... ... ... | 2,843 0 0 | 1,974 5 0 | ... | |
| The Gházipur Stud Farm lands ... ... | 9,057 0 0 | 9,057 0 0 | .. | |
| Reclamation of waste lands ... ... ... | 1,800 0 0 | 2,283 0 0 | ... | |
| | 17,800 0 0 | 15,488 6 9 | ... | |
| Total ... | 18,100 0 0 | 15,701 9 0 | ... | |
| CHARGES. | | | | |
| *I.—Detailed Account No. 3.— Land Records and Agriculture, North-Western Provinces and Oudh.* | | | | |
| Pay of Gazetted Officers ... ... ... | 29,066 0 0 | 27,073 15 5 | 1,992 0 7 | |
| Do. Establishment ... ... ... | 24,864 0 0 | 24,648 14 11 | 215 1 1 | |
| Travelling Allowance of Gazetted Officers ... ... | 3,800 0 0 | 2,839 9 0 | 960 7 0 | |
| Ditto Establishment ... ... | 1,400 0 0 | 1,120 2 0 | 279 14 0 | |
| Office contingencies ... ... ... ... | 6,370 0 0 | 6,342 15 8 | 27 0 4 | |
| Traffic registration charges ... ... ... | 20,000 0 0 | 18,952 6 10 | 1,047 9 2 | |
| | 85,500 0 0 | 80,977 15 10 | 4,522 0 2 | |
| *II.—Experimental Farms and Factories.* | | | | |
| Establishment (pay) ... ... ... ... | 4,133 0 0 | 3,914 15 3 | 218 0 9 | |
| Conveyance allowance (drawn by Assistant Director) ... | 300 0 0 | 281 10 8 | 18 5 4 | |
| Travelling allowance of establishment ... ... | 400 0 0 | 394 13 6 | 5 2 6 | |
| Supplies and services and contingencies ... ... | 10,261 0 0 | 9,970 1 11 | 290 14 1 | |
| Agricultural and Kanúngo School (moiety) ... ... | 2,698 0 0 | 2,647 6 4 | 50 9 8 | |
| Well experiments and workshops ... ... | 4,300 0 0 | 4,291 13 11 | 8 2 1 | |
| Reclamation of waste lands ... ... | 3,650 0 0 | 3,647 6 2 | 2 9 10 | |
| Dairy experiments ... ... ... ... | 739 11 3 | 739 11 3 | ... | |
| Agricultural shows ... ... ... | 480 0 0 | 474 1 2 | 5 14 10 | |
| Crop experiments ... ... ... | 500 0 0 | 446 15 0 | 53 1 0 | |
| Miscellaneous experiments ... ... ... | 1,488 4 9 | 1,486 11 0 | 1 9 9 | |
| | 28,950 0 0 | 28,295 10 2 | 654 5 10 | |
| Total ... | 1,14,450 0 0 | 1,09,273 10 0 | 5,176 6 0 | |

NOTE.—Certified that the receipts in this office were checked in the manner prescribed in G. O. No. 34, dated the 5th October 1882.

J. S. MESTON,
*Director of Land Records and Agriculture,*
*N.-W. Provinces and Oudh.*

# ORDERS OF GOVERNMENT.

No. $\frac{1014}{\text{I—307C}}$ OF 1899.

## RESOLUTION.

REVENUE DEPARTMENT.

*Dated Allahabad, the* 14*th March* 1899.

READ—

Letter No. $\frac{212}{\text{VIII—277}}$, dated $\frac{\text{23rd November 1898}}{\text{16th January 1899}}$, from the Director of Land Records and Agriculture, being his Report on the Operations of the Department of Land Records and Agriculture, North-Western Provinces and Oudh, for the year ending 30th September 1898.

OBSERVATIONS.—The report, which was drawn up by Mr. J. S. Meston, has been submitted with commendable punctuality. It has been again prepared in the form prescribed by the Government of India in the eighth of the Resolutions of the Agricultural Conference of 1893 and 1895-96, and it briefly summarizes the work that has been done by the Department during the year in the various branches under the Director's control.

2. An account is given in Chapter I of the tours of inspection made by the Director, the Assistant Director, and the Superintendent of Land Record Surveys, and of the work done by them individually. In addition to the ordinary work of the Department, the Director was engaged in an enquiry into taxation at Meerut, with special reference to the octroi, and was a member of a Committee on the Revenue Bill, while his Assistant was engaged for some time in an enquiry into the condition of the sugar industry.

3. The measures taken towards improving the efficiency of the Land Record establishments are succinctly described in Chapter II. The general standard of educational qualifications amongst patwáris has been raised by the introduction of a new system of departmental examinations in place of the former method of leaving the test entirely in the hands of local committees; while a large number of these officials have been given a special training in practical surveying with the different Survey parties at work in the Provinces. The insistence on a higher standard of work and qualifications has given greater prominence to the necessity for improving the position and prospects of the patwáris. The demands now made on the Patwári Fund place financial obstacles in the way of any general increase in their pay, but steady progress is being made in raising salaries in the districts in which they are most inadequate. The thorough training given at the Agricultural School, Cawnpore, to candidates for kánúngoships must have the effect of gradually raising the stamp of officers of this class; and a valuable training in Survey is now given to those who are deputed to Survey parties. But the ordinary candidates for kánúngoships are frequently of an inferior stamp, and District Officers should satisfy themselves more carefully of their general fitness before allowing them to appear at the examination.

4. In Chapter III, "'Utilization of Land Records," information is given of the steps taken to improve the material which forms the basis of the annual analysis of districts. Good progress has been made in the compilation of village registers and pargana books in the new form for these districts in which the settlement has been revised. The utility of these compilations in enabling District Officers to localize the parts of districts in which deterioration is apprehended, and in suggesting the form which enquiries should take, is being gradually recognised, and the Lieutenant-Governor expects that the books will now be properly maintained and systematically used in all districts in which they have been introduced. A fairly successful attempt was made to associate the Land Record staff with agricultural enquiries by employing selected kánúngos in connection with the investigation into the condition of the sugar trade and industry.

5. The subject of the connection of the Department with the branches of scientific enquiry under Imperial control is dealt with in Chapter IV. Further progress has been made in the work done by the Cadastral Survey Department for cartographical purposes. A summary is given in this chapter of the work of the Civil Veterinary Department, which forms the subject of a separate report. Horse-breeding operations continue to progress, though it has been impossible in recent years to provide funds to meet the demand for stallions. Experiments in Agricultural Chemistry were few as compared with previous years, owing to Dr. Leather's absence from India during the greater part of the year.

The trade statistics annually collected by the Department show a slight fall in the import trade with Nepal as compared with the preceding year, but exports to Thibet were abnormally heavy, owing to large despatches of grain from Almorá. The exports to Nepal also show an increase due to larger despatches of salt and sugar. The statistics of rail-borne traffic give satisfactory evidence of the recovery of the Provinces from the effects of the famine. There was a falling off in imports of 26 per cent., owing to diminished receipts of food grains on the cessation of the scarcity; but the export trade rose by 31 per cent., due to a revival in trade in the agricultural products of the Province. A beginning has been made in the direction of registering the river-borne traffic between Bengal and these Provinces.

The first quinquennial tabulation of the results of crop-cutting experiments showed that the system of conducting the experiments required modification, and new rules have been prepared and issued, under which these cuttings will be made in seventeen selected and typical districts, and not throughout the Provinces, the work being undertaken by a single officer in each district, who will give his undivided attention to it. The experiments will be fewer in number, but a much higher standard of accuracy and of discrimination in the selection of fields for the experiments may be expected.

6. An account is given in Chapter V of the scientific and local enquiries conducted under provincial direction. The experiments at

the Cawnpore Farm were conducted on the usual lines, and are more fully dealt with in the separate report on the Farm. But there was a very considerable and satisfactory development in the work of distributing good seed; and in this branch of the Department's duties good work of permanent value is being done. The Department should give special attention to the improvement of indigenous staples, and the selection and distribution of good seed are essential to any progress in this direction. There was a large increase in the number of implements sold and given out on trial. The new form of improved plough was in great demand, and the sales very largely exceeded those of the previous year. The falling off in the demand for irrigation appliances was to be expected, as the Provinces did not suffer from drought as in 1896-97.

The Department has taken steps to keep in closer touch with the agricultural work on Court of Wards estates; in a few districts good work has been done in the direction of improving horse and cattle breeding, distributing good seed, and introducing improved implements. On the private farms the most important work is done at Meerut, where the operations have now been taken over by the District Board.

The special enquiry into agricultural defects (section D of this chapter) has been limited to the reclamation of *úsar* land. There are now three Government reserves—Juhi, near Cawnpore; Gursikran, near Aligarh; and a new one just established at Abbaspur, near Unao. The Assistant Director, under whose control the reserves have been placed, has given an interesting account of the experiments made in them. In the first two reserves the effects of enclosure, embankment, retention of rain water, and exclusion of grazing are seen in the improvement of the soil and the disappearance of the salts. The growth of grasses is said to have been luxuriant, and the yield of hay was higher than usual. Success has also attended the "deep *thala* system" of planting trees.

In the Abbaspur reserve, *babúl* plantations have been started, with the object of determining whether the demand for tanning materials would enable such plantations on a larger scale to be worked at a profit. The experiment has started well.

7. In the matter of agricultural education, referred to in Chapter VI, the Department is directly concerned only with the Agricultural School maintained at Cawnpore, in which candidates are trained for kánúngoships. The working of this School during the year was satisfactory, and the Government notices with interest that the latest batch of students were superior in point of education to those admitted in previous years.

8. As regards the publication of agricultural information (Chapter VII), measures are being taken for securing a permanent record of the agricultural circumstances of each district, but the work of compilation will take time. This is a branch of the work of the Department to which the Lieutenant-Governor looks for considerable

practical benefit. It is for the Department to prepare such information on the agricultural history of each district as may enable the executive officers in charge to know in what direction agricultural deterioration is most to be apprehended, and how it can best be remedied or dealt with.

9. This report, which merely summarizes the annual operations of the Department, is rightly kept within a somewhat limited compass. It is unnecessary to insert in it details that already find a place in the separate report on various branches of the work, and further abbreviation should be aimed at if possible. The numerous matters with which the Department had to deal during the year were satisfactorily disposed of by the Director, Mr. Meston, and his staff, and the Government desires to acknowledge the ability and efficiency with which the Department was controlled and directed.

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ORDER.—Ordered that a copy of the above Resolution be forwarded to the Director of Land Records and Agriculture, North-Western Provinces and Oudh, for information and guidance.

J. O. MILLER,

*Chief Secy. to Govt., N.-W. P. and Oudh.*

# REPORT

ON THE

# Operations of the Dept. of Land Records & Agriculture,

## NORTH-WESTERN PROVINCES AND OUDH,

*FOR THE YEAR ENDING 30TH SEPTEMBER 1899.*

*ALLAHABAD:*
North-Western Provinces and Oudh Government Press.
*1900.*

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## *ERRATA.*

*Report on the Operations of the Department of Land Records and Agriculture, North-Western Provinces and Oudh, for the year ending 30th September* 1899.

PAGE i (Index).—Add "dots" and "*ib.*" against "23. Entomology."

„ i „ Omit "dots" and "*ib.*" against "24. Statistics."

„ ii „ *Read* "*ib.*" against "39—42. Publication of Agricultural information" *for* "18."

„ ii „ „ "*ib.*" against "44 and 45. Conclusion" *for* "18 and 19."

„ ii „ „ "19" against "A.—Statement, &c., &c." *for* "21."

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„ 11.— Omit "the" from the end of line 5 of paragraph 28.

„ 14, line 38.—*Read* "sterility" *for* "sterlity."

„ 15, „ 12.— „ "ægyptiaca" *for* "ægyptiaca."

„ 15, „ 11 of paragraph 30(3).—*Read* "broad" *for* "board."

# REPORT

ON THE

# Operations of the Dept. of Land Records and Agriculture,

## NORTH-WESTERN PROVINCES AND OUDH,

***FOR THE YEAR ENDING THE 30TH SEPTEMBER 1899.***

No. $\frac{860}{\text{VIII—342}}$.

FROM

W. H. MORELAND, ESQ.,
DIRECTOR, DEPT. OF LAND RECORDS AND AGRICULTURE,
N.-W. PROVINCES AND OUDH;

TO

THE CHIEF SECRETARY TO GOVERNMENT,
N.-W. PROVINCES AND OUDH,
REVENUE DEPARTMENT.

*Dated Lucknow, the 31st January* 1900.

SIR,

I HAVE the honor to submit the Annual Report on the work of this Department for the year ending the 30th September 1899. In accordance with the orders of Government on last year's report, I have, as far as possible, omitted all matters of detail that already find a place in separate reports.

## CHAPTER I.

### PREFATORY.

2. Mr. J. S. Meston held the Directorship of the Department up to the 30th November 1898, when he proceeded on privilege leave. The Assistant Director, Saiyid Muhammad Hadi, M.R.A.C., M.R.A.S., was in charge of the Department, in addition to his own duties, from the 3rd to 18th of December, when he was relieved by me. I have held charge for the remainder of the year. The post of Assistant Director was held by Saiyid Muhammad Hadi throughout the year except for the period from 18th July to 4th September 1899, when he was on privilege leave, and Kázi Aziz-ud-din Ahmad, Deputy Collector, officiated for him.

3. Before proceeding on leave Mr. Meston made a brief tour in the district of Jalaun with a view to reporting on the prospects of resettlement.

The first matter that required my attention when I took charge was the effect of foreign competition on the sugar industry in these Provinces, and the end of December was spent at Cawnpore in the study of this question. During January and February I marched through the Etáwah, Etah, and Mainpuri districts, my tour being interrupted by visits to Cawnpore and Lucknow in connection with the sugar question. During this tour I made a detailed inspection of land records work and collected materials for reports on the prospects of resettlement: at the same time I examined the condition of the local sugar industry, and gathered some information regarding the growth of *kâns* in sandy land, and the indigenous methods of planting trees in *úsar*. In the beginning of March I travelled to Saháranpur at the request of the Chief Engineer, to discuss the water supply of the Botanical Gardens; after arranging this matter and inspecting the gardens, I returned to Lucknow and thence visited Azamgarh, Gorakhpur and Basti. At Azamgarh I disposed of questions that had arisen in connection with the Land Records Survey, and also examined the progress of the work; at Gorakhpur and Basti I arranged for the early completion of the revised village registers. After a halt at Lucknow, during which I inspected the office work of the Horticultural Gardens, I visited Sháhjahánpur, Bareilly, Pilibhít, and Kheri to dispose of questions

connected with survey and settlement operations. I then inspected the Meerut Demonstration Farm, and at the end of March I travelled to Allahabad to be present at a meeting of the Provincial Service Examination Committee. During April I visited Gonda and Farukhabad to inspect the Survey Offices, and I also inspected the *úsar* reserve at Abbaspur. The rest of the month was spent at Cawnpore in examining the second year class of the Agricultural School, and in rearranging the experimental work of the Farm on the lines decided by my predecessor in consultation with the Assistant Agricultural Chemist to the Government of India.

I spent May and June in Naini Tal, returning to the plains on July 6th. My first journey was to Partábgarh, to make arrangements for systematic distribution of cleaned and selected seed; thence I travelled to Farukhabad, where some difficulties had arisen in the survey. My next halts were at Etah and Etáwah, where the preliminaries of the survey were settled with the Collectors. At the beginning of August I had again to visit Azamgarh in connection with survey matters, and I made two inspections of the Abbaspur *úsar*; the rest of the month, until the 24th, was entirely occupied by the Kanúngo and Amín examinations. The last week of August and the whole of September were spent at Naini Tal.

4. The Assistant Director spent the greater part of the cold weather in enquiries into the cultivation of the sugarcane and the manufacture of the various forms of sugar. During these inquiries he visited the districts of Fyzabad, Bara Banki, Etáwah, Mainpuri, Rae Bareli, Partábgarh, Sultánpur, Jaunpur, Azamgarh, Gorakhpur, Basti, Gonda, Hardoi, Bareilly, Pilibhít, Sháhjahánpur, and Benares; the actual outturn of different varieties was determined by numerous experimental crop-cuttings, and detailed inquiries were made in all these districts. In March he accompanied Mr. J. F. Duthie, the Director of the Botanical Department of Northern India, to the *úsar* reserves at Gursikran (Aligarh), Juhi (Cawnpore), and Abbaspur (Unao); attended the Agricultural Show at Muzaffarnagar, and went to Jaswantnagar in Etáwah to confer with a zamíndár about the distribution of selected seed among cultivators. In April he attended the Nauchandi Fair in Meerut, saw the Meerut Demonstration Farm, and paid an informal visit to the Remount Depôt at Karnál to advise the Superintendent who had consulted me as to the treatment of *úsar* land. Towards the end of the month he assisted me in conducting the final examination of the students of the Agricultural School. In May he visited Sultánpur in connection with the supply of some improved implements and seeds to a private farm, and addressed a gathering of landlords on the subject of Agricultural improvements. He then proceeded to Partábgarh to confer with the Deputy Commissioner about the establishment of a seed depôt in that district. In June he was employed in collecting seed in Jaunpur, and in carrying out the sugar inquiry in parts of Rohilkhand. In the first week of July he again went to Partábgarh to complete the arrangements for the opening of the seed depôt. The reserves at Abbaspur and Juhi were visited frequently during the year.

Qázi Aziz-ud-din Ahmad while officiating as Assistant Director, inspected the Abbaspur reserve and Meerut Demonstration Farm in July, and the Gursikran reserve in August. He assisted me in conducting the Kanúngo examination in Lucknow, Cawnpore and Aligarh during August; and towards the end of the month he went to Gorakhpur to enquire about some insects which were damaging the *kharif* crops.

5. The Superintendent of Surveys, Mr. G. B. Scott, visited in October 1898 the several survey centres. From 1st to 20th November he personally trained a class of 12 junior Civilians near Bareilly. In December as there were no assistants available for this duty, he re-fixed positions of local boundary pillars, or replaced them by others, on the Nepál-Almora and Nepál-Naini Tal boundary, connecting the whole by a theodolite and chain circuit with previous work, and drew up map and *khasra* of the same for the Commissioner, Kumaun Division. He then marched through the Pilibhít and Bareilly districts, examining patwáris at work. In February he relaid lost boundaries in the Rámganga and Ganges rivers where there were disputes between districts Sháhjahánpur, Budaun, and Farukhabad, and submitted maps and reports to the Settlement Officer.

In March he examined, by personally running check lines across numerous villages, the old maps of districts Agra and Muttra, and in April revisited all the districts under survey. In May and June he completed the contour-survey extensions in Naini Tal and examined survey work in that district.

6. The staff at the Director's disposal on the Agricultural side of the department has long been insufficient for the work that has to be done. Government has sanctioned the appointment of an Agricultural Inspector from April 1st, 1899; at present the post has been created for two years only. To this post I have appointed Munshi Zamin Husain, who is a graduate of the Allahabad University, and has been learning Agriculture at Cawnpore for some time: he has been employed mainly on matters connected with the sugarcane inquiry, and has given me great assistance.

## CHAPTER II.

### Land Records Establishments.

7. The subject-matter of this chapter has been dealt with in detail in the contribution to the Revenue Administration Report for the year. Here it is proposed only to give a brief account of the action that has been taken towards the improvement of the Land Record staff.

8. *Training of patwáris.*—Local requirements continue to affect the number of patwári schools. The Lalitpur school, which was closed last year, is now about to be reopened. On the other hand, schools have been closed in those districts where survey operations have begun, the teachers and pupils being sent to receive practical training in the field. Teachers have also been sent from seven other districts to go through a course of practical surveying, so that they may be competent to teach this subject; while arrangements have been made to supply accurate surveying instruments to all schools where the stock was found to be inadequate or deteriorated. The question of establishing one or more schools for the hill tracts of the Kumaun Division is being considered by the local authorities.

The number of passed patwáris continues to improve. The percentage exceeds 95 in seven districts, is between 90 and 95 in 11, and falls below 70 in one (Allahabad) only, where the Collector is taking steps to have the old unpassed men replaced by their heirs. The system of simultaneous examination introduced in 1897-98 to raise the standard of patwáris' training has worked satisfactorily. During the year under report two examinations were held—the first in October 1898 and the second in April 1899—with the following results:—

| | Total. number examined. | Total. number passed. |
|---|---|---|
| Rules and duties of patwáris ... ... | 2,658 | 1,239 |
| Arithmetic ... ... ... ... | 2,833 | 1,868 |
| Mensuration ... ... ... ... | 2,689 | 1,480 |

The papers set in 1897-98 were admittedly rather stiff; during the past year they have been made somewhat easier, while still affording a proper test of knowledge. The original answer papers have been re-examined wherever the results appeared exceptionally good or exceptionally bad, and in some cases the marking has been revised. In this way a nearer approach to uniformity of standard is being gradually attained.

The attendance at the patwári schools this year has increased to 3,499 from 3,241 in 1897-98. Of those who attended 1,382 or 39·5 per cent. passed the examination against 25·21 per cent. in the preceding year. There is also an increase in the number of men trained in practical surveying: 1,720 against 1,533 in the previous year having attended the classes, of whom 1,418 qualified.

9. *Prospects of the patwári.*—During the year under report an estimate was submitted to the Board of Revenue of the number of circles required and the increased expenditure needed to improve the position of patwáris in Oudh. The number of patwáris and assistants estimated is 7,838 against the present number 8,262, but the improvement in pay will involve an extra expenditure of about Rs. 50,000 per annum. Detailed proposals for the revision of circles in the Hardoi and Lucknow districts have since the close of the year been submitted for the orders of

the Board of Revenue, while those for the Sítapur, Sultánpur, and Bara Banki districts are in course of submission. In the North-Western Provinces Government has sanctioned the final rearrangement of patwári circles and salaries in Basti and Budaun at an increased cost of Rs. 654 and Rs. 88 per mensem, respectively. To mitigate undeserved hardship to patwáris whose pay has been permanently reduced, personal allowances have been granted to the extent of Rs. 11 per mensem in Basti, Rs. 69 in Budaun, and Rs. 186 in Bijnor. Twenty-six patwáris have received promotion to higher posts in the Land Records Department. As was remarked last year, the amount of promotion depends entirely on the District Officers, but there is at present no reason to suppose that the patwári element is acquiring too much prominence in the supervising staff.

10. *Training of kanúngos.*—The annual examination of kanúngos was held as usual during the rainy season. Out of 234 men who appeared for the examination only 37 passed in all subjects and 194 in part. Of the number of successful candidates, nine have not yet received practical training in surveying, and will be required to join a survey party; on the other hand, 281 candidates from several districts were attached to survey parties for instruction, and the majority succeeded in obtaining certificates of proficiency in practical work. The type of candidate at the examination was again very inferior, and during the latter part of the year the method of recruiting kanúngos has been under consideration. The Board of Revenue has accorded a general approval to a scheme which I submitted, and I am now engaged in preparing the necessary amendments in the Kanúngo Rules. The main object of my proposals is to secure that all supervisors shall eventually have passed through the Agricultural School where they receive adequate training in their duties, and also go through a course of scientific and practical agriculture. At present 15 candidates are annually admitted to the school for training as kanúngos.

11. *Prospects of the kanúngo staff.*—Thirty kanúngos received temporary promotion to the post of Naib Tahsíldár during the year, but not a single permanent promotion was made, nor were any kanúngos admitted to higher appointments. Four kanúngos were selected as qualified candidates for Naib Tahsíldárships. Many of the temporary promotions given during the year were for very short periods, and the great majority of the supervisors have now no prospect of promotion except in the clerical line, as they do not possess the examinational qualification required for Naib Tahsíldárships. The consequence must be that supervisors will devote their attention mainly to the clerical work that goes before their superiors, and will regard their executive work as less important. This is a matter which should right itself in time when many of the supervisors shall have the required qualifications; but during the years of transition the efficiency of the staff must suffer from the absence of any opportunity of rising in the service.

12. *Kanúngo Inspectors.*—Following on the remarks made by my predecessor in last year's report, I submitted during the year proposals for reorganizing the staff of kanúngo inspectors. The principle of my proposals—fewer men on better pay—was accepted by Government, and reorganization will be carried out as vacancies occur in the existing staff.

## CHAPTER III.

### Utilization of Land Records.

13. This chapter deals with the steps taken to improve the material which forms the basis of the district analysis. Revised village registers are now complete and in use in the districts noted on the margin. Compilation is proceeding in Meerut, Sháhjahánpur, Bareilly, and Kheri under the orders of the Settlement Officers; and in the Gursarai

*1. Saháranpur.
*2. Muzaffarnagar.
*3. Bulandshahr.
4. Bijnor (so far as resettled).
5. Budaun.
6. Jhánsi (except Gursarai).
7. Gorakhpur.
8. Basti.
*9. Lucknow.
*10. Unao.
*11. Rae Bareli.
12. Sítapur.
13. Hardoi.
14. Fyzabad.
15. Sultánpur.
16. Partábgarh.
17. Bara Banki.

Estate of Jhánsi by the special office under my control. All the pargana hand-books have been published for the districts marked with an asterisk in the foregoing list; in the remaining districts they are either being compiled or in process of publication.

The special office has now practically completed the first part of the programme laid down for it on its establishment: all that remains is the completion of work in the Gursarai Estate of Jhánsi, and the preparation of hand-books for that district. The Board of Revenue has been asked for orders as to the districts which shall be taken up next.

The value of the village registers, whether in the old form or the new, becomes clearer as time goes on; but there is still in some places a tendency to omit the record of matters that should find a place. Instructions have been issued during the year explaining the method in which these records should be systematically used, and the results reported annually to the Director.

14. A further advance was made during the year towards meeting the wishes of the Government of India that the Land Record staff should be employed on special agricultural inquiries. A set of questions on matters connected with the cultivation of sugarcane was circulated to most districts for report by selected supervisor kanúngos; the replies received were naturally of unequal value, but some of them were very useful.

## CHAPTER IV.

### Scientific and National Inquiry under Imperial Control.

15. **Geography.**—In the drawing section, attached to the traverse parties, working under the Survey of India Department, the two-inch standard maps of the Lalitpur Sub-Division of Jhánsi were completed, and those of Sháhjahánpur commenced. One hundred and sixty-four square miles of hilly and forest lands in these districts, which were omitted from the sixteen-inch survey, were surveyed topographically on the two-inch scale. The village maps of Bahraich, Bareilly, and Kheri have now been placed in the Drawing Office for completion of standard maps. The Deputy Surveyor-General has also ordered a complete recompilation of the Meerut standard maps, as the changes since last topographical survey have been found to be too large for incorporation in the old maps by the ordinary method of correction.

The Drawing Office has now been placed under the Superintendent of Provincial Surveys, who has found it necessary to largely increase the number of draftsmen in order to keep pace with the survey.

The area cadastrally surveyed during the year was 3,312 square miles, and practically the whole amount was done by patwáris working under the Survey Officers. The maps prepared will in due course be utilized for the standard maps compiled by the Drawing Office.

16. **Geology.**—The usual returns of the production of minerals in these Provinces were submitted during the year; but beyond this, the Department has made no contribution to Geological Science.

17. **Meteorology.**—No contribution has been made to Meteorological science by the Department during the year.

18. **Botany.**—Mr. J. F. Duthie, the Director of the Botanical Department of Northern India, has during the year assisted the Department by identifying specimens of sugarcane and of *úsar* grass. He has also very kindly permitted his draftsman to prepare a large number of drawings of different varieties of sugarcane in connection with the inquiries of the Assistant Director.

Mr. Duthie also inspected the *úsar* reserves at Juhi, Abbaspur, and Gursikran in company with the Assistant Director, and his report is in the hands of Government.

19. **Economic products.**—The Reporter on Economic Products to the Government of India was supplied during the year with 12 sets of articles on various indents received from him.

20. **Veterinary Science.**—The report of the Superintendent, Civil Veterinary Department, has already been submitted to Government. The following matters may be mentioned :—

The number of Veterinary Assistants employed in the Provinces has risen during the year from 23 to 27. Since the close of the year Government has intimated that a beginning can be made in the employment of a subordinate inspecting agency ; and detailed proposals are now being submitted. The want of an inspecting staff has been greatly felt in the past. There is also a need for more Veterinary Assistants ; but the number of these who can be employed depends on the District Boards, who have to find their salary.

The number of stallions at work shows a slight increase, and the percentage of successful coverings has improved. The system under which mares and young stock were registered by patwáris has now been discontinued and replaced by a less cumbrous and equally effective check on the work of the departmental subordinates.

Mule breeding was carried on with moderate success during the year. A scheme for utilizing cast mares for this purpose has been approved by Government, and as a beginning five mares have now been issued to breeders.

The Glanders and Farcy Act has been extended to the whole of the Provinces, and instructions for the diagnosis of these diseases have been issued to the Inspectors appointed under the Act and to other officials who are concerned in its administration.

The cattle disease known as " warbles " was investigated during the year by the Superintendent of the Civil Veterinary Department, and inquiries into the prevalence of rabies among dogs and jackals were made at the request of the Inspector-General. The result of these inquiries goes to show that there has been no serious increase of this dreaded disease.

No institution for the provision of Veterinary instruction exists in these Provinces, but a few students receive a preliminary training at the Depôt at Bábugarh before joining the Lahore Veterinary College. In accordance with the original scheme of the agricultural school, I have arranged to give the students an elementary course of veterinary instruction, intended chiefly to enable them to recognise the more prevalent forms of contagious disease.

21. **Bacteriology.**—A supply of the fungus which has been found so destructive to locusts in South Africa has been received from the Imperial Bacteriologist, and a few tubes of it have been issued to District Officers for experiment : no results of value have yet been reported, as locusts have not recently appeared in great numbers.

22. **Agricultural Science.** (a) *Chemistry.*—During the year under report Dr. J. W. Leather, Assistant Agricultural Chemist to the Government of India, analysed several samples of manure intended for use at the Cawnpore Experimental Farm. He visited the Farm in November 1898, and after discussing with Mr. Meston the future programme of the experiments he drew up a note suggesting the necessary modifications. His suggestions have been accepted with a few modifications, and practical effect is now being given to them. The most important change is the decision to give greater prominence to the determination of the merits of different varieties of the chief staples. A beginning has been made with *juár* (*Sorghum vulgare*), but our collection of local varieties is not yet complete. The working-plan for the farm, based on Dr. Leather's advice, is now being drawn up, and will be circulated to the various Provincial Departments as required by the Government of India.

Dr. Leather has also made an analysis of samples of *úsar* soils received from the Superintendent of the Karnál Remount Depôt, who consulted me as to the best method of dealing with the barren land under his charge. I must not omit to acknowledge the great assistance which Dr. Leather has given me in my endeavours to devise a simple and rapid method of determining the amount of injurious salts prevalent in alkali soils.

(*b*) *Mechanical inventions.*—Nine applications for leave to file specification of inventions relating to agricultural machinery were received for report from the Government of India. On a few of them it was found necessary to obtain the opinion of an expert, but the majority were examined and reported on by the Assistant Director.

23. **Entomology.**—Valuable assistance was rendered by the Superintendent of the Indian Museum, Calcutta, in the identification of certain insect pests injurious to the sugarcane crop in connection with the Assistant Director's inquiries on the industry. A few specimens of an insect, which caused much damage to the rice crop in the Himálayan and sub-Himálayan districts were also sent to him for identification towards the close of the year.

24. **Statistics.**—The statistics of traffic compiled during the year under report were (*a*) the foreign traffic with Tibet and Nepál, (*b*) the rail-borne traffic, (*c*) the river-borne traffic between Bengal and the North-Western Provinces and Oudh, and (*d*) the internal road traffic of the Meerut Division. The statistics in question have already been reviewed in the Annual Reports of the Foreign and Inland Trades of the Province. The following are the more striking features of the statistics of the year :—

(1) *Foreign traffic.*—The import trade with Tibet rose by 16,211 maunds in weight and Rs. 42,670 in value owing to larger receipts of borax, salt, and wool; on the other hand the export trade fell off by 80,351 maunds in weight and about four lakhs of rupees in value, owing mainly to the cessation of the abnormal exports of grain that marked the preceding year.

The trade with Nepál fully recovered from the fall of 1896-97. The imports rose by 4,19,727 maunds in weight and Rs. 10,14,131 in value, owing mainly to larger receipts of grain and oilseeds. Exports at the same time advanced by 32,773 maunds in weight and Rs. 8,87,318 in value in consequence of increased supplies of cotton-goods, metals, salt, and sugar.

(2) *Rail-borne traffic.*—The statistics of rail-borne traffic continue to give evidence of the recovery of the Provinces from the effects of the famine. The plentiful crops of the province caused a further reduction in the imports of food-grains; but owing to larger receipts of coal the total import trade advanced by 11 lakhs of maunds, or about 4 per cent. in weight. The increases in the imports of cotton-goods, dyes and tans, copper, brass, salt, and spices were maintained during the year under report, and indicate a marked increase in the spending power of the community. Foreign refined sugars continued to oust the country product until the statistical year closed on March 31st. Among the exports the trade in indigo fell off, as a small area had been sown and the yield was poor. There was also a fall in the exports of hides and skins, not to be regretted if it indicates a decrease in the mortality among cattle. There were on the other hand large increases in the exports of grain, oilseeds, and sugar, so that the total export trade of the province rose by 117 lakhs of maunds or 41 per cent. in weight.

(3) *Agricultural statistics and reports on crops.*—There is little to add to what has been said in previous reports regarding the agricultural returns and reports on crops, which are compiled and issued by the Department. Under orders received from the Statistical Bureau of the Government of India the sugarcane crop has been added to the list of crops on the prospects of which the Department issues periodical forecasts, and the first forecast was issued in August. Crop experiments were made under the new rules in selected districts in the *kharif* of 1898 and the *rabi* of 1899. The results appear to be satisfactory as the experiments have been made with care and attention. The returns of agricultural statistics for 1898-99 have been submitted to the Director-General of Statistics, and their detailed review will find a place in the Board of Revenue's Administration Report. The return of agricultural stock will in future be submitted quinquennially under the orders of Government; and the first census, on the results of which the present year's return was based, has been taken during the year under report.

The agricultural returns, like those of traffic, show that the Provinces continued to make a satisfactory recovery from the famine of 1896-97. The area cultivated during 1898-99 advanced by 741,296 acres, and the area cropped during the year by 873,005 acres. The *kharif* area increased by 162,471 acres, and the *rabi* area by 748,361 acres; but there was a fall of 37,827 acres in the *zaid* area. Both cultivated area and cropped area were only 2½ per cent. below the average of the years 1893-95.

The other branches of the statistical work of the Department call for no remarks.

25. **Forestry.**—Forestry proper is under the charge of a separate Department, and the Agricultural Department deals mainly with the system of roadside arboriculture, a detailed report on which has already been submitted to Government. The most prominent feature of the year's operations was the increase in receipts which for the first time covered the whole expenditure and left a profit of Rs. 3,241. The babul plantation at Abbaspur in Unao is described in paragraph 30(3).

## CHAPTER V.

### Scientific and Local Inquiry under Provincial direction.

### SECTION A.—Government Farms.

26. (*i.*)—*Experimental Agriculture.*—The only Government experimental farm under the control of the Department is the Cawnpore Farm. The experiments conducted there have been fully discussed in the separate report submitted to Government, and are therefore not described here. The work has now been thoroughly systematized and the working-plan will shortly be published.

(*ii.*)—*Distribution of seed.*—The following statement compares the distribution of seed during the year under report with that in the two preceding years:—

*Statement showing the distribution of seed during the three years* 1896-97 *to* 1898-99.

| Name of seeds. | 1896-97. Weight in lbs. | 1897-98. Weight in lbs. | 1898-99. Weight in lbs. |
|---|---|---|---|
| *Kharif* | | | |
| Sorghum | 24½ | 160 | 70 |
| Guinea grass seed | 1½ | ... | 3 |
| Bájra (*Pennisetum typhoideum*) | 4,515 | 266½ | 514 |
| Gujrati Bajra (ditto) | ... | 432½ | 1,355 |
| Paddy seed (*Oryza sativa*) | 82 | ... | 135 |
| Arhar (*Cajanus indicus*) | ... | 82 | ... |
| Maize | 7,018 | 12,179¾ | 12,454 |
| Sawan (*Panicum frumentaceum*) | 3,762 | ... | ... |
| Kodon (*Paspalum scrobiculatum*) | 62,342 | ... | ... |
| Mandua (*Eleusine Coracana*) | 291 | ... | ... |
| Babul seed (*Acacia arabica*) | 512 | 82 | 82 |
| Ingaduleis seed | 200 | 193 | 72 |
| Seed, canes | 5,000 | 1,400 | ... |
| Juar grain (*Sorghum vulgre*) | 77½ | 787 | 164 |
| Dhak seed (*Butea frondosa*) | 92 | ... | ... |
| Indigo | ... | 24½ | 5 |
| Urd (*Phaseolus radiatus*) | ... | 264½ | ... |
| American cotton seed | ... | 70 | 266 |
| Ditto maize | ... | 3½ | ... |
| Tilli (*Sesamum indicum*) | ... | 205 | ... |
| Tobacco seed (*Nicotiana tabacum*) | ... | 20½ | 2 |
| Mung (*Phaseolus mungo*) | ... | 4 | ... |
| Country cotton seed | ... | 10 | 20 |
| Castor seed | ... | ... | 82 |
| Moth (*Phaseolus aconitifolius*) | ... | ... | 78 |
| Maize cobs | ... | ... | 82 |
| Sorghum cobs | ... | ... | 4 |
| *Hibiscus cannabinus* | ... | ... | 20½ |
| Lobia seed (*Vigna catiang*) | ... | ... | 8 |

*Statement showing the distribution of seed during the three years* 1896-97 *to* 1898-99.

| Name of seeds. | 1896-97. Weight in lbs. | 1897-98. Weight in lbs. | 1898-99. Weight in lbs. |
|---|---|---|---|
| ***Rabi.*** | | | |
| Wheat (*Triticum sativum*) ... | 14,093½ | 1,61,079 | 58,181 |
| Country barley (*Hordeum vulgare*) | 6 | 1,763 | 3,017 |
| Cape oats (*Avena sativa*) ... | 2,490 | 10,162¾ | 7,165 |
| Peas ... ... ... ... ... | ... | 1,312 | 656 |
| Lucerne ... ... ... ... ... | 4½ | 71 | 32 |
| Poppy seed ... ... ... ... ... | 50 | 22 | ... |
| Masur (*Ervum lens*) ... ... ... ... | 55 | ... | ... |
| Country gram (*Cicer arietinum*) ... ... ... | ... | 113 | 74 |
| White gram (Kabuli) ... ... ... ... | ... | 477½ | 330 |
| Alsi (*Linum usitatissimum*) ... ... ... | ... | 41 | 164 |
| Sarson (*Brassica campestris*) ... ... ... | ... | 6 | 197 |
| Rye (*Secale cereale*) ... ... ... ... | ... | 91 | 51 |
| Potato seed ... ... ... ... ... | ... | 410 | 410 |
| Huskless barley ... ... ... ... ... | ... | 82 | 656 |
| Carrot seed ... ... ... ... ... | 1,40,448 | 66,502 | ... |
| Canadian oats (*Avena sativa*) ... ... ... | ... | ... | 57 |
| English peas ... ... ... ... ... | ... | ... | 4 |
| Kusum seed (*Carthamus tinctorius*) ... ... ... | ... | ... | 82 |
| Methi (*Trigonella fœnum-græcum*) ... ... ... | ... | ... | 82 |
| Cauli flowers ... ... ... ... ... | ... | ... | ¼ |
| Turnips ... ... ... ... ... | ... | ... | ¼ |
| Radish seed ... ... ... ... ... | ... | ... | 82 |

The Department has been devoting special attention to this important branch of agricultural work for the last three years with the result that there has been a marked improvement in the seed business. The staples most largely distributed are maize and *bájra* in the *kharíf*, and wheat, barley and oats in the *rabi*. There has been an appreciable increase in the distribution of the two *kharíf* staples. Special arrangements had to be made for collecting the maize seed in Jaunpur; the Gujrati bájra was obtained through the Director of Land Records and Agriculture of Bombay.

Among the ***rabi*** cereals barley was issued in a larger quantity than in the previous years; the huskless variety having been grown specially for the purpose at the Farm. The indents for oats were not so numerous as in the past year. The last year's figure of wheat distribution included the heavy item of 123,000lbs. supplied to the Burmese Agricultural Department for experimental cultivation in the Southern Shan States. During the year under report the Burmah indent amounted only to 5,125lbs.; hence the decrease in the quantity of wheat distributed. If the Burmah supply be left out of consideration, the quantity issued during the year amounted in round figures to 53,000lbs. against 38,000lbs. issued in the past year. One of the indents for wheat seed came from the Khedevial Agricultural Society of Egypt.

The results of the cultivation of *rabi* seeds supplied to Mr. N. F. T. Troup of the Almora district, and referred to in the past year's report were communicated to the Department during the year. They showed that the Egyptian and Muzaffarnagar varieties of wheat and the Canadian oats did well in the Almora villages where they were tried; but the rye seed obtained from England is reported to have completely failed to germinate in the hills as was the case at the Cawnpore Farm.

An important feature of the work done in the line of seed distribution during the year was the establishment, with the approval of the Local Government, of a small seed depôt in Partábgarh, a district where the seed ordinarily sown by the cultivator is of a particularly poor quality. The funds for carrying out the scheme were mainly advanced by Government. A beginning has been made by the

distribution of selected and cleaned seed for the *rabi* now in the ground: the results must be awaited before it can be said whether the scheme is a success.

(*iii.*)—*Distribution of Implements.*—This subject has been discussed in detail in the last report on the Cawnpore Farm. A large number of improved ploughs has again been distributed, and there has been an increased demand for the chain pumps and the "Baldeo" water-lift, which are manufactured by the Department. Efforts continue to improve the efficiency and reduce the price of these lifts.

In terms of the Government of India's Circular No. 13-72-16, dated 3rd May 1899, the yearly submission to Government of a list of agricultural implements and machines tested at the Experimental Farm, Cawnpore, has been discontinued; and the list now forms an appendix to this report.

(*iv.*)—*Well-sinking.*—During the year under report 83 trial borings prior to sinking wells were made in 14 districts against 131 borings done in 16 districts in the previous year. The decrease in the number of borings was not due to any slackness in the demand for boring tools which was as brisk as before. A number of these borings had to be taken in places where the strata happened to be rather hard, and consequently took longer time than usual; and much loss of time was caused by the necessity for constant repairs to the old and worn out sets of tools. Two new sets were purchased during the year. The staff of well-sinkers consisted as usual of eight men. They are paid by those who employ them at the rate of Rs. 12. per mensem in addition to travelling expenses, and the railway freight of the tools is also paid by the indentors. The well-sinkers not only take trial borings, but remove the difficulties which commonly arise in the sinking of well-cylinders and their services are much appreciated by zamíndárs. The total expenditure incurred in well experiments, including the cost of new tools during the year, amounted to Rs. 1,278-9-8 against Rs. 1,344-1-4 expended last year.

(*v.*)—*Agricultural shows.*—Only four shows were held during the year under report, *viz.* Kakora, Bulandshahr, Muzaffarnagar, and Meerut. The last two shows were attended by the Assistant Director, and in the first two the Department was represented by other officials. The Assistant Director as usual presided over all the agricultural committees at the fairs attended by him and awarded prizes to agricultural exhibits. In the ploughing competitions held at these fairs the first prize was invariably carried off by the Watts' plough, and the work done by the Meston plough received general approbation. It was interesting to notice that at Muzaffarnagar most of the samples of the refined sugar known as *khand* had been freely adulterated with powdered beet or Mauritius sugar in order to improve their general appearance. Similarly a few samples of *shakkar* (raw sugar) appeared to have been adulterated with *bura* (a form of native refined sugar). All adulterated samples were carefully discarded by the Assistant Director, who, in his note to the Collector, suggested that necessary measures should be taken to stop such specimens being admitted in the show-room. At the Meerut show the samples of agricultural produce were not as numerous as might have been expected, and only 63 head of cattle were exhibited as compared with 72 in the preceding year. At Muzaffarnagar the number of cattle exhibited during the year exceeded that of the last year by 93; but there was no noticeable improvement in the quality of animals except perhaps with regard to buffaloes. The plough-cattle were particularly poor. Besides the improved implements exhibited by the Agricultural Department, only two machines, *viz.* (1) model of a chain pump combining the principles of the Persian wheel and the gear pumps; and (2) a wooden sugarcane mill with four rollers, both lately invented by Mr. William of Nahan, were exhibited at the Nauchandi Fair. These machines appeared to be promising; but no definite opinion can be given on them without more exhaustive trials than are possible at a public exhibition. Mr. William promised to send these machines to Cawnpore for trial, but they have not yet been received. No agricultural implements of improved design were exhibited by native artizans unconnected with the Department.

*(vi.)—Cattle breeding.*—Eight bulls of various breeds were issued by the Department during the year under report, one to Saiyid Mehdi Ali Khan of Jánsath in the Muzaffarnagar district, one to the Chairman of the Hamírpur District Board, two to the Chairman of the Jalaun District Board, one to the Special Manager of the Court of Wards Estates in Sítapur, one to the Meerut Demonstration Farm, and two to the Special Manager of Gorakhpur. The first bull was supplied free of cost on the Collector's recommendation with a view to improve the local strain in the neighbourhood of Jánsath. The bull lent last year to Mr. Abbot of Jhánsi has been returned to this Department, as the farm on which it was employed has been sold.

Four breeding bulls were kept at the Cawnpore Farm. They covered 67 cows: 24 cows are reported to have calved, four were served unsuccessfully, and in the remaining cases the results are not known. At the time of submission of the last year's report the result of 12 coverings was not known. Out of these 11 cows have calved, and one is reported to have been served unsuccessfully. The value of these bulls is much appreciated by the cultivators of Cawnpore and the neighbourhood.

## SECTION B.—Private Farms.

**27. On Court of Wards' Estates.**—From the reports of District Officers received during the year, it appears that in 29 districts no action was taken in connection with the improvement of agriculture or stock-breeding, either because there were no estates under management, or because the small size and poverty of the estates made it impossible to do anything. In the remaining 19 districts more or less useful work has been done. Trials of improved varieties of field crops were conducted in eight districts, the principal varieties being Jaunpur maize, Gujrati *bájra*, Muzaffarnagar wheat, Kábuli peás, Panjábi gram, Cape oats, and different kinds of rice. Muzaffarnagar wheat appears to be generally approved; there are no signs at present of the cultivators adopting the other varieties. Masonry wells were either constructed or repaired in five districts, much progress being made in Gonda by assisting tenants to make wells for themselves. The experiments in reclaiming *úsar* continued in the Allahabad estates. A number of improved implements were purchased and tried by various estates in Gházipur, Bara Banki, and Gonda. Stock-breeding is mentioned in the reports of nine districts. The bulls kept for breeding have generally been useful; mule-breeding has not made any progress.

A successful meeting of the Court of Wards' Managers was held at Cawnpore in October 1898: a similar meeting will be held next February.

**28.—Private Farms managed by Private individuals.**—(1) *The Meerut Demonstration Farm.*—This farm, managed under the Meerut District Board, is fully described in last year's report. The method of management and the nature of the experiments carried out have undergone no alteration during the year. The Chicago Aërmotor, referred to in last year's report, continues to attract much attention from the the zamíndárs and cultivators of the neighbourhood, many of whom came to the farm and watched its working carefully for a considerable time. The Aërmotor is undoubtedly useful in its present position; but the question whether it would pay in general use depends on the number of hours in the irrigation season when there is sufficient wind to work it. I have obtained the loan of a windgauge from the Meteorological Department, and hope to make some accurate determinations on this point during the present season.

A stud consisting of an Arab stallion, a Kábul donkey, a country donkey, three bulls of different varieties, a Tejpur ram, a Kashmir goat, and a Hissar buffalo is attached to the Farm for breeding purposes; the services of all these animals being available to the public free of charge. The stud is much appreciated by the breeders, and a distinct improvement in the number and quality of the stock bred in the Farm neighbourhood is now noticeable. During the year under report experiments with *kharíf* crops were carried on in 18 plots and with *rabi* crops in 49 plots, aggregating

8½ acres, the remaining area having been devoted to profitable farming. Some of the experiments are on lines similar to those at Cawnpore; and the results of the past year agree generally in the two places. It is unnecessary to give the results in detail in this place; when the experiments have lasted long enough to enable accurate conclusions to be drawn, the details will be published separately.

(2) *Jatau Farm.*—Kunwar Karan Singh, a zamíndár of the Agra district, is the owner of this farm, which covers about 70 acres, and is worked by the improved agricultural implements in common use at the Cawnpore Farm. Out of several varieties of wheat tried at this Farm, Muzaffarnagar wheat is reported to have given the best results, and this variety is distributed by the owner of the farm to the cultivators for seed purposes. In an experiment to try the effect of various manures on wheat, cattle-dung is reported to have given very satisfactory results. Trials of *juár* for fodder were continued with results similar to those reported last year. A few more private farms of this type and with similar management would be a valuable aid to the Department. The cessation of experiments at the Ujhauli farm was reported last year, and no new farm has been established.

## SECTION C.—Agricultural Associations.

29. (1) *The Provincial Agricultural Association.*—No general meeting of the Association was held during the year for reasons indicated at the end of paragraph 27 of the last year's report. A small conference of zamíndárs and talúqdárs was held at the Cawnpore Farm on the 26th and 27th of November 1898, the Assistant Director having arranged the meeting in communication with Saiyid Muhammad Husain, then a Deputy Collector of Bara Banki, who takes an active interest in this class of work and was himself present at the meeting. The Assistant Director delivered an interesting lecture on agriculture with special reference to the necessity of introducing improved methods of cultivation. The experiments in reclamation of waste land at Juhi, the working of the improved agricultural implements, and the experiments conducted at the farm were clearly explained to the gentlemen on the spot, and samples of the various staples produced at the farm were shown to them. It is intended to hold similar conferences this year.

(2) *The Porter Association of Baraun in the Allahabad district.*—This Association, of which Rae Bahádur Thákur Mahabir Prasad Narayan Singh is the Secretary, maintains no experimental Farm, but works in the interest of agriculture in other ways. Hitherto the efforts of the Association have been confined mainly to the construction of masonry wells, the introduction of Muzaffarnagar wheat seed, and the extension of sugarcane cultivation. A copy of the Association's report for 1306 fasli received from the Secretary, shows that the area under sugarcane in the Arail pargana, the chief centre of the Society's work, rose to 1,355 bíghas against 705 bíghas planted in the previous year, showing an increase of 650 bíghas. Muzaffarnagar wheat was sown extensively in several villages and good produce obtained. Lal Partab Singh, Rae Bahádur, compiled a Hindi Treatise on Agriculture during the year for the benefit of the members of the Association.

(3) *The Bijnor Agricultural Society.*—No formal report of its work has been received from this Society. On the advice of Mr. Pert, their President, the Association procured through this Department seed canes of four varieties of sugarcane from the eastern districts for experimental cultivation in Bijnor, where cane is a most important crop. A report on the result has been promised after the harvest.

## SECTION D.—Special Inquiry into Agricultural Defects.

30. The reclamation of waste land continues to be the subject of special inquiry. The investigation now comprises two branches, the study of patches of barren land in different parts of the country, and systematic experiments on three reserves in the possession of the Department. The object of the former branch of inquiry, which has been started afresh during the year, is to collect by actual

observation and experiment facts as to the conditions of the sub-soil which co-exist with barrenness of the surface. Much of the information on record on this subject is vague and general, and the detailed study of sub-soils exposed by trial pits has already disclosed certain facts which do not altogether fit in with current theories on the subject. But the process of collecting facts will have to go on for a long time yet before any conclusions can be drawn. The want of a skilled analyst is much felt in this work; I hesitate to trouble the Agricultural Chemist with the very large number of samples of which analysis is desired, and my constant absence on tour prevents me from making many detailed analyses for myself; but with Doctor Leather's assistance I have now arranged a method of partial analysis which appears so far to give results of relative accuracy, and which certainly saves a good deal of time. The work done during the year at the reserves may be summarized as follows:—

(1) *Juhi.*—The *úsar* reserve at Juhi, about six miles from the Cawnpore Farm, comprises an area of 102 acres. The soil is a very compact clay, somewhat impregnated with salts, more or less injurious to plant life; but the chief cause of unproductiveness seems to lie in the physical character of the soil, which is almost impermeable by rain water. As a result of enclosure and restriction of grazing, the natural vegetation has been improving steadily year after year. The commonest grass now is *Chloris tetrostachya*, which during the last few years has ousted the typical *usar* grass (*Sporabolus pallidus*) to a considerable extent. Among the better grasses *Andropogon annulatus* has established itself to a greater extent than others that have been tried. A certain amount of standing grass is sold every year to grasscutters of the Cawnpore city. Eleven acres of grass were sold for Rs. 33 during the year under report. On the limited area from which grass was cut for hay-making, the yield of hay amounted to 40 maunds per acre. Reclamation of the land is carried on to a limited extent by deep tillage and manuring, but chiefly by planting and sowing trees. The area reclaimed by the first method is usually devoted to the cultivation of cereals and other crops. During the year under report the yield of wheat-gram in the reclaimed land amounted to 7½ maunds, of rice to 7¾ maunds, and of Lucknow melons to 92 maunds per acre, and a very fair crop of *arhar* and hemp is now on the ground. The results have so far shown that by thoroughly breaking and pulverising the land by tillage and with manure and irrigation ordinary grain or fodder crops can be produced. In the experiment (referred to in the previous year's report) of mixing sand with the surface soil in order to loosen its texture, the plot in which sand was mixed allowed wheat to germinate fairly while on the control-plot, to which no sand was added, the seed failed entirely.

Greater attention is paid to the question of planting fuel-yielding and hardy timber trees, chiefly babul (*Acacia arabica*), dhák (*Butea frondosa*), nim (*Melia indica*) and shisham (*Dalbergia sissu*). All attempts to grow these trees by sowing the seed broadcast or on ridges and in trenches or in *thálas* only one or two feet deep have completely failed; but planting according to the method referred to in previous reports as the deep *thála* system has been so far successful. This system has now been under trial for three years and the continuous observations made during these years have shown that where the *thálas* were filled with fairly good earth mixed with manure, the results have been most satisfactory, not a single death having occurred among the trees planted in such *thálas*. Where the *thálas* were filled with good earth without the addition of manure, the progress of the trees has been nearly equally good, and no casualties have occurred among them, but where the earth dug out of the *thalas* has been put back into them the trees have not thriven. Fifty per cent. of those planted in such *thálas* in 1897 and 8 per cent. of those planted in 1898 have already died. Apart from the few trees planted in *thálas* prepared in this manner, the numerous plants grown under the deep *thála* system in previous years are making very good progress. The following trees were planted under the system during the year under report:—

Ber (*zizyphus jujuba*) 20, nim 37, *shisham* 37, *jamun* 60, *mahua* 152, *babul* 206. *Mahua* (Bassia latifolia) failed last year because good seedlings could not be

obtained. This year's plantation of *mahua* is at present in a very promising condition. Among the fruit trees guavas and jamun (Eugenia jambolana) have done best, and a great variety of fruit trees, altogether 56 in number, has been planted during the year in order to see which of them are the most suitable for cultivation on land of this type. Of the 20 Eucalyptus trees planted last year, only five have survived: in this case too the majority of the seedlings had lost their vitality during the journey from Saháranpur to Cawnpore. The plantation of agave as a hedge was extended during the year. The tanning trees referred to in the previous year's report are all in a healthy condition.

The receipts of the reserve during the year amounted to Rs. 95-15-6 and the expenditure to Rs. 882-6-6. Tree planting having only recently showed promise of success, it is not to be expected that the receipts of this reserve will greatly increase for some years yet.

(2). *Gursikran.*—The reserve at Gursikran, covering an area of about 960 acres, acquired in 1885, is situated at a distance of about six miles from Aligarh. It consists of two kinds of land, *viz.* (1) *Kallar* a very stiff clay, slightly infected with alkali, which grows the grasses known as gandar (*antistheria prostrata*) and dáb (*Eragrostis cynosuroides*) in great abundance under natural conditions, and (2) *usar* the well known type of barren land highly charged with injurious salts, the top layer being very loose in texture and lying on a stratum of hard clay embedded with nodules of kankar or in places a pan so hard that the roots of the trees planted cannot ordinarily pierce through it. The only vegetation which grows on such lands is the typical usar grass known as *Sporabolus pallidus*. The *kallar* land when thoroughly broken with the plough and pulverised by tillage is rendered capable of yielding ordinary grain and fodder crops but the usar land cannot be made fit for cultivation by this treatment.

A large area of *kallar* land has been brought under cultivation in previous years in the manner indicated. The total cultivated land amounts to about 97 acres, of which 15 acres were under direct management during the year under report, and the rest leased to tenants at a rental of Rs. 486-3-0. Muzaffarnagar wheat was the principal crop in the plots held in direct management, the highest outturn obtained being 133 maunds per acre. Rape seed and oats grown for feeding cattle yielded 73 maunds of green fodder per acre. Juár and sugar sorghum were sown in the *kharif*, but owing to deficient rainfall the crops, which are now being cut for feeding cattle, are far from luxuriant.

Simple enclosure or tillage does not bring about any material change in the condition of the *usar* land. A new experiment was undertaken during the year with a view to determine how far the sterlity of the land was due to the salts in the upper layers and how far to the condition of the soil. The underlying soil was thoroughly pulverised, and cultivation was then tried. Rice was planted on the land and at first promised well, but the rains entirely failed from the end of July and the crop withered. The present interest of the experiment is scientific rather than practical; it is being continued this year, gram having been sown where the rice failed. The growth of the natural grass on the *úsar* in general has been somewhat poorer than in the previous year owing to deficiency of rainfall and the yield of hay is likely to be proportionately lower. The seed of the Australian grass *Eragrostis fulcata* refered to in the last year's report was again tried during the year in a small plot of *úsar* but failed to germinate. The superior grasses continued their progress. No attempt was made during the year to grow *babul* and *dhák* by sowing the seed broadcast or on ridges, as these systems had repeatedly failed in previous years, but 104 trees of Shisham (*Dalbergia sissu*), 60 of nim (*Melia indica*), 130 of babul (*Acacia arabica*) 5 of Farash (*Tamarix articulata*), 23 of guavas, and 200 of Jhau (*Tamarix gallica*) were planted under the deep *thála* system in holes four feet deep refilled with imported earth. All these trees are doing very well. All the trees planted last year under the same system except those of mahua, which died out, are in a flourishing condition and there is at present every reason to hope that they

will grow successfully, but the condition of the trees planted in 1897 under the same system in holes refilled with the usar earth that was dug out of them is at least as unsatisfactory as that of trees grown similarly at Juhi, the frost of January last having killed most of them: those that survived are looking sickly. This shows the importance of filling the *thalas* with comparatively good earth before planting the seedlings. As a matter of fact wherever this has been done the trees have grown exceptionally well during the past four years. In the past year five *babul* trees were planted in *thalas* filled with *usar* earth mixed with gypsum. Out of these one died out and the remaining four are in good condition. Some insects made their appearance in the year under report and began to damage the young trees at the reserve, but they were killed by syringing the trees with a solution of London purple. The trees of *jait* (Sesbania ægyptiaca) and *dhak* (Butea frondosa) are doing very well. Date palms are getting on slowly as usual. The guava plantation has been further extended by planting 23 trees under the deep *thala* system during the year. In the experiments with ensilage the best quality of silage was obtained, as in preceding years, by mixing chopped *juar* with the *usar* grass before pitting it in the silo. The *usar* grass, to which salt at the rate of one pound to the maund was added before pitting, gave ensilage which was more relished by cattle than what was made without the admixture of salt. The following results were obtained during the year under report in the experiment started originally at the suggestion of Dr. J. W. Leather in 1895 to determine the weight of dung obtained from (*a*) a pair of bullocks fed on grass and straw only, and (*b*) a pair to which five pounds of oil cake were given in addition:—

| | Pair (*a*). Mds. s. c. | Pair (*b*). Mds. s. c. |
|---|---|---|
| Total weight of fresh dung during the year ... ... ... | 157 36 6 | 110 2 0 |
| Ditto at the end of the year, *i.e.*, when converted into manure after fermentation. | 60 5 0 | 50 10 0 |
| Total weight of fresh litter applied during the year ... ... | 49 5 8 | 40 22 8 |
| Ditto the litter at the end of the year when converted into manure. | 45 10 0 | 38 10 0 |

The total receipts and expenditure of the reserve during the year under report amount to Rs. 1,032-2-3 and Rs. 1,837-1-11, respectively.

(3). *Abbaspur.*—The *usar* reserve at Abbaspur, three miles north-west of Unao, was taken up last year in order to carry out on a large scale the experiment in planting *babul* under the deep *thala* system which had proved so promising of success at Juhi and Gursikrau. The area consists of 88 acres, the purchase of which has now been completed, for Rs. 314-10-0. The soil at this reserve is a typical specimen of the *usar* which occurs commonly in South Oudh, containing a considerable quantity of soda salts. Altogether 1,416 trees were planted during the rains of 1898; and they are all alive and showing vigorous growth. They were watered regularly until the beginning of the rains in June 1899, the earth round them was frequently stirred and a little manure applied to its surface. Since the rains began they have been left to their own resources. A small area was sown board-cast but the results were as unsuccessful as they have been in other reserves except on isolated patches of comparatively good land. A sum of Rs. 3,000 was given by the Government of India as a special grant during the year under report in order to extend the operations at this reserve. With this money besides the funds available in the budget of this Department, planting of *babul* on an extensive scale was carried out during the year under report, 6,000 *thalas* having been planted. The young trees in these *thalas* are as promising as can be expected; the trees planted early in the rainy season are naturally more vigorous than those planted towards its close. They will receive the same treatment as was given last year. In this reserve the financial question is most important and regular capital and revenue accounts are being maintained. The cost of the small number of trees planted in 1898 worked out to about Re. 1-2-0 a head up to the time when they were left to shift for themselves; working on the larger scale rendered possible this year by the generosity of the Government of India, it appears probable that the cost per head will be below twelve annas. The difference is due first to the cheaper rate at which large contracts for digging can be arranged, and secondly to the division of fixed charges over a larger number of trees. I spent several mornings at Abbaspur during the season

when work was in progress, and satisfied myself that the utmost economy was being observed; but real economy can be attained only by large expenditure.

(4) *Amramau.*—The *usar* plot at Amramau reclaimed by this Department by deep tillage and manuring and sold off in 1892 has been kept under observation. It has, as reported last year, passed into the hands of a pensioner, who knows nothing about agriculture. The cultivation has been dwindling down and with the exception of a few bighas of unirrigated sickly crops of rabi, the whole of the land is lying fallow. The owner has sold the standing grass for Rs. 80, and allowed the purchasers to graze their cattle on the land for a year. The place looks desolate, the buildings are in a dilapidated condition and with tillage utterly neglected, the texture of the soil is deteriorating rapidly.

## SECTION E.—Government Gardens and Miscellaneous.

31 (1).—*Saháranpur and Lucknow Gardens.*—The annual reports of the gardens of Saháranpur and Lucknow, which have been submitted to Government, give full details of the year's work. Here it is sufficient to say that aided by favourable seasons, the Superintendents were able to work their gardens without cost to Government, while numerous varieties of fruit and other trees were tried during the year, and some interesting results obtained.

(2) *Muktesar Orchard, Kumaun.*—There has been difficulty about the management of this garden which no longer serves any useful purpose, and since the close of the year it has been decided to make over the land to the Bacteriological Department.

(3) *Khusru Garden, Allahabad.*—The garden is reported to have been considerably improved under Mr. Davies, present Superintendent.

(4) *Táj Gardens, Agra.*—The chief events of the year have been the enlargement of the Garden Committee by the addition of two new members, a special visit of inspection by Mr. Ridley, the Superintendent of the Lucknow Gardens, and the revision of the system of accounts. Mr. Ridley gave much useful advice which the Committee has resolved to follow as far as possible.

32. **Dairies.**—The Government Dairy Farm at Cherat in the Aligarh district has now been sold outright to Mr. Keventer, to whom it had previously been leased, and the Department now conducts no dairy experiments.

33. **Lucknow Museum.**—The report of the Museum Committee has already been submitted to Government. Important additions were made to the zoological and numismatic sections of the Museum, and steps were taken to improve the arrangement of the coin cabinet, and to provide expert advice on the acquisition of coins by the appointment of a small committee of numismatists. The art depôt was worked at a small profit, and is reported to be popular with manufacturers and with European and native purchasers. The number of visitors to the Museum increased considerably during the year.

## CHAPTER VI.

### Agricultural Education.

34. There has been no development of importance during the year in the matter of agricultural education, and it is sufficient to give here a short account of the progress of the agricultural school, and to note briefly one or two other matters of interest.

35. **Agricultural School.**—The staff of the agricultural school during the year consisted as usual of the Principal and the two Assistant Masters, the Principal who was on sick leave having rejoined his duties on the 20th December 1898. The class of students admitted during the year now consists of sixteen lads, five of whom are Muhammadans and eleven are Hindus. Some students have, as usual, withdrawn shortly after being admitted. Of those that remain twelve are in the kanúngo section and one has been sent to the school by the Panjáb Educational Department for training. A few students were admitted into the land-owner section, but only one of them is a *boná fide* student attending the school with the object of fitting himself for his position as a landlord. On the whole there has been a steady rise in the class of students since the opening of the school, and this year's students are of really good type and give every promise of shaping into valuable servants of Government. The final examination was held in April last. In order to ascertain the quality of the instruction

and training afforded at the school, I conducted most of the examination myself, taking the subjects of General Chemistry, Agricultural Chemistry, Gymnastics and Riding. Mr. Duthie was kind enough to conduct the examination in Botany and the subject of agriculture was divided between Pandit Sri Lal, M.R.A. C. and the Assistant Director. I must say I was agreeably surprised by the results of the examination: with hardly an exception, the students had mastered the various subjects of instruction, and many of them showed a high standard of intelligence. Subjects such as Chemistry and Botany are apt to become mere cram, text books and lecture notes being learnt by heart; to avoid this risk as far as possible, I have arranged that more work shall be done in the laboratory and less instruction given by lectures. Out of the 17 candidates that appeared 16 passed, 5 being placed in the first division and the rest in the second division. The students were not examined in surveying as they had been through a course of practical work with a survey party and had received certificates of proficiency. The senior students who passed out in April last were, as usual, required to cultivate small plots under wheat and other crops; this part of the training was somewhat neglected during the absence of the Principal. It is a very important feature of the school work, and has now been put on a thoroughly practical footing.

There are now four horses in the students' riding club purchased and maintained at their own expense. It has been found impossible to obtain the services of a regular instructor in riding; last year the students were trained by one of the mounted police, but the District Superintendent has this year found himself unable to spare a man. Instruction is consequently given by the school staff. Gymnastics are practised under a trained instructor and regular exercises with light dumb-bells and clubs are gone through every day. This regular training is producing a distinct improvement in the physique of the students. Among pastimes football and lawn tennis hold the principal rank. A debating society is also in existence, which, like the recreation clubs, is principally managed by the students themselves.

The question of sending young zamíndárs, who are under the Court of Wards to be trained at the school, has hung fire owing to the want of sufficient boarding accommodation. A project for adding a new wing to the boarding-house has been administratively sanctioned.

36. The question of establishing an Agricultural College in these Provinces has again been raised in Resolution No. $\frac{2044}{\text{I}-720\text{A}}$, dated June 14th, 1899; so far I have received no communication in the matter from the Educational Department.

37. A suitable candidate has been selected during the year for education at the Royal Agricultural College, and Government has agreed to give him the financial assistance prescribed by the rules. He is at present receiving a course of preliminary instruction at Cawnpore, and will proceed to England in the spring.

38. **The Vernacular Agricultural Journal.**—This is a monthly journal published by the Department in Urdu, and contains discussions on agricultural questions of practical utility. The subscription, including postage for the residents of North-Western Provinces and Oudh, is fourteen annas and for distant subscribers Re. 1-6-0 per annum. The circulation shows a slight increase, but the paper cannot yet be said to be popular. The total receipts from subscriptions during the year under report amounted to Rs. 158-10-0 against Rs. 169-8-0 realized in the last year, the decrease being due mainly to the fact that back numbers of the journal were not sold so largely as in the past year.

## CHAPTER VII.

### Publication of agricultural information.

39. Annual reports are received from District Officers on the subject of agricultural deterioration, and from these a note is prepared which is printed in the Administration Report of the Board of Revenue. I am now engaged in compiling the reports of the past five years; and the results will be submitted to Government in due course. I doubt, however, whether they are worth publishing at present; much of the information gathered from the earlier reports is very vague, and in some cases it is contradictory. In order to exercise the necessary supervision over

these reports, I have arranged for the preparation of registers in my office showing for each pargana those annual statistics which are important from the agricultural point of view. With the aid of these registers, which may be compared to the Pargana Books maintained in district offices, the Director will at once be able to note the parganas which statistics show to be deteriorated ; and it will then be possible to obtain information from the local officers as to the cause of injury. The information so obtained as well as the material parts of the annual reports will be compiled in portions of the registers allotted for the purpose, and when this system has been followed for a sufficient number of years, the record of general deterioration will be practically complete.

40. Pending the receipt of a note from the Reporter on Economic Products to the Government of India regarding the system of ledgering economic information, temporary arrangements were made for collecting useful information in accordance with the general outlines of the scheme laid down by the Government of India. The note has now been published as Agricultural Ledger No. 6 of 1899 and steps are being taken to introduce the system in my office.

41. No paper was communicated to the Agriculture Ledger by this Department in the course of the year. A note on the sugarcane disease caused by the fungus *trichosphairia Sacchari* has been printed and is about to issue. Other notes prepared and printed during the year for general information were :—

(1) A conspectus of the experiments carried out at the Experimental Farm, Cawnpore;

(2) A list of improved implements manufactured for sale and use at the Experimental Farm.

Some papers dealing with the results of experiments made at the Farm are now under preparation and will, it is hoped, be published during the present year.

42. The sugarcane enquiry referred to in the last year's report was completed during the year, and the Assistant Director has compiled a memorandum on the subject which, it is hoped, will shortly be published. Such portions of the enquiry as directly concerned the question of the competition of foreign sugars were summarized in a note which I submitted to Government in February last. This note also contained a full discussion of all the available statistics of the industry ; it has been issued to the public with other papers on the subject, and I have therefore thought it unnecessary to republish any part of it in the Ledger.

## CHAPTER VIII.

### FINAL.

43. No communication other than the annual report on the administration of the Registration Department was received from that Department; and no suggestions or comments were submitted by this Department.

44. In conclusion I wish to place on record my acknowledgments of the good work done by my staff during the year. I am especially indebted to my Personal Assistant, Mir Saiyid Husain, who has, as usual, conducted his onerous duties with the utmost efficiency. Special acknowledgments are due also to Mr. P. V. Subbiah, Principal of the Agricultural School and Superintendent of the Cawnpore Farm. The Head Clerks, Babu Prag Das, Munshi Mashuq Ali, B.A., Munshi Dulare Lal, B.A., and Munshi Ali Sajjad, B.A., have conducted the work of their different departments to my general satisfaction.

45. I may be permitted here to bring to notice the services of the officers in charge of survey parties. In no department does the work make greater demands on the zeal and energy of the officers employed, and the results attained during the year are creditable to all.

I have the honor to be,

SIR,

Your most obedient servant,

W. H. MORELAND,

*Director.*

# APPENDIX A.

*Statement showing the receipts and expenditure of the Department of Land Records and Agriculture, North-Western Provinces and Oudh, for the financial year* 1898-99.

| Heads of receipts and charges. | Budget estimate (revised). | Actual. | Savings. | Remarks. |
|---|---|---|---|---|
| RECEIPTS. | Rs. a. p. | Rs. a. p. | Rs. a. p. | |
| *Miscellaneous (Provincial) Scientific and other Minor receipts.* | | | | |
| Agricultural Department ... ... ... | 300 0 0 | 178 14 6* | ... | |
| *Experimental Farms and Factories.* | | | | |
| Experimental Farm ... ... ... | 3,500 0 0 | 3,293 5 5 | ... | |
| Workshop and well experiments ... ... | 3,500 0 0 | 2,330 3 0 | ... | |
| The Gházipur Stud Farm lands ... ... ... | 9,057 0 0 | 9,057 0 1 | ... | |
| Reclamation of waste lands ... ... ... | 2,200 0 0 | 2,076 3 0 | ... | |
| Total ... | 18,257 0 0 | 16,756 11 6 | ... | |
| | 18,557 0 0 | 16,935 10 0 | ... | |
| CHARGES. | | | | |
| *I.—Detailed Account No. 3, Land Records and Agriculture, North-Western Provinces and Oudh.* | | | | |
| Pay of gazetted officers ... ... ... | 28,406 0 0 | 27,005 8 6 | 1,400 7 6 | |
| Pay of establishment ... ... ... | 25,529 0 0 | 25,525 9 6 | 3 6 6 | |
| Travelling allowance of gazetted officers ... ... | 3,000 0 0 | 2,989 1 0 | 10 15 0 | |
| Ditto Establishment ... ... | 1,330 0 0 | 1,087 7 9 | 242 8 3 | |
| Office contingencies ... ... ... | 6,835 0 0 | 6,823 8 3 | 11 7 9 | |
| Traffic registration charges ... ... ... | 22,814 0 0 | 22,249 14 7 | 564 1 5 | |
| | 87,914 0 0 | 85,681 1 7 | 2,232 14 5 | |
| *II.—Experimental Farms and Factories.* | | | | |
| Establishment (pay) ... ... ... | 4,180 0 0 | 4,134 13 1 | 45 2 11 | |
| Conveyance allowance (drawn by Assistant Director) ... | 300 0 0 | 300 0 0 | ... | |
| Travelling allowance of establishment ... ... | 550 0 0 | 538 9 6 | 11 6 6 | |
| Supplies and services and contingencies ... ... | 12,415 0 0 | 10,397 5 1 | 2,017 10 11 | |
| Agricultural and Kanúngo school (moiety) ... ... | 2,915 0 0 | 2,914 7 3 | 0 8 9 | |
| Well experiment and workshops ... ... ... | 4,800 0 0 | 4,799 15 0 | 0 1 0 | |
| Reclamation of waste lands ... ... ... | 4,300 0 0 | 4,296 3 9 | 3 12 3 | |
| Dairy experiments ... ... ... | 500 0 0 | 500 0 0 | ... | |
| Aricultural shows ... ... ... | 600 0 0 | 599 13 9 | 0 2 3 | |
| Crop experiments ... ... ... | 82 9 0 | 88 15 0 | ... | |
| Miscellaneous experiments ... ... ... | 1,055 0 0 | 1,055 0 0 | ... | |
| | 31,697 9 0 | 29,625 2 5 | 2,078 12 7 | |
| Total ... | 1,19,611 9 0 | 1,15,306 4 0 | 4,311 11 0 | |

NOTE—Certified that the receipts in this office were checked in the manner prescribed in G. O. No. 34, dated the 5th October 1882.

* Including Rs. 169-3-0 not adjusted by the Accountant-General, North-Western Provinces and Oudh, through misclassification in the Cawnpore Treasury.

W. H. MORELAND,
*Director, Land Records and Agriculture,*
*North-Western Provinces and Oudh.*

## APPENDIX B.

*List of agricultural implements and machines which have been tested at the Government Experimental Farm, Cawnpore, during the year ending 30th September 1899, and of those in use which are reported to have met with more or less marked success.*

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|
| Number. | Designation of implement. | Use. | Special advantages or instructions. | Price. | Where procurable. | Name and designation of official reporter. | Opinion. | Extent to which used by native agriculturists. | Remarks by official reporter. |
| 1 | Kaisar plough. | Breaking land and inverting the soil. | Cheapness, lightness (being only 16 seers in weight). The share can be removed at any time and fitted at will. The iron parts are made of ordinary sheet iron; so that repairs can be easily done by an ordinary village blacksmith. | Rs. 5 ... | Government Farm, Cawnpore. | S. M. Hadi, Esq., M.R.A.C., Assistant Director, Land Records and Agriculture, North-Western Provinces and Oudh. | A good strong soil-inverting plough. It can plough an acre of land in 16 hours, the furrows being 4 to 4½ inches deep and 5 inches wide. | The plough is used by some well-to-do agriculturists in different parts of these provinces, but is being gradually superseded by the more efficient Watt's plough. | Seven were sold during the year under report. |
| 2 | Watt's chain plough. | Ploughing heavy lands and inverting the soil | Easy draught and adaptable to the various modes of preparing the ground. | Rs. 7 (besides cost of chain). | Ditto ... | Ditto ... | More effective, stronger and more durable than the Kaisar plough. This implement is in common use at the Government Experimental Farm, Cawnpore, and maintains the reputation it acquired in previous years. It goes from 5 to 6 inches deep in the ground, making a furrow about 9 to 10 inches wide. It ploughs an acre of *dumat* land in a day. | Is specially appreciated and used by several well-to-do cultivators throughout the provinces. Is also often indented for from other provinces. | Twenty-eight were sold, three given on trial and two on hire during the year under report. |
| 3 | Watt's beam plough. | Inversion of soil and ploughing heavy lands. | Easy draught and adaptability to the various modes of preparing the ground. No chain is used for working this plough. | Rs. 8 ... | Ditto ... | Ditto ... | Just as No. 2, but used to a smaller extent than No. 2. | Some have been indented for from other provinces, and used chiefly by cultivators in the neighbourhood of Bulandshahr. | Four were sold during the year under report. |
| 4 | Baldeo plough. | Ploughing light soils. | Inversion of soil, simplicity of construction, cheapness and efficiency of work. | Rs. 2-8 ... | Ditto ... | Ditto ... | Is suitable for districts in which cattle are small and weak. It ploughs an acre of *dumat* land about 3½ inches deep in a day. | Is used by native cultivators in some places, notably Hardoi and Farukhabad. | Five were sold during the year under report. The demand of this plough has greatly decreased since the introduction of the "Improved Baldeo plough." |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 5 | The Improved Baldeo plough. | Breaking and inverting light soils. | Stronger and more durable than the old Baldeo plough. | Rs. 3-8-0 | Ditto ... | Ditto ... | It is larger and stronger as compared with No. 4; ploughs the soil more effectively than the old Baldeo plough. An acre of *dumat* land can be ploughed in 16 hours, the width of the furrow being 6½ inches and the depth 4 inches. | Is used and much appreciated by the native cultivators. Has been indented for from various parts of India. | Twenty-three were sold during the year under report. |
| 6 | The Meston plough. | Breaking and inverting soil. | Strong, durable, light, cheap, suitable for all kinds of soils. Easy of repairs and simple in construction. | Rs. 4-0-0 | Ditto ... | Ditto ... | This implement has all the good qualities ordinarily desirable in a plough. Its weight is only about 26lbs, and though it is suitable for light soils, it works satisfactorily on clayey soils also. Even the inferior class of bullocks can work it easily. The ploughman has to undergo little exertion in working it. The mould board being made of wrought iron is particularly strong, and the standard and the share which are made of cast iron are much more substantial than those of the "Improved Baldeo plough." For the price it is the best soil-inverting plough among those so far invented at the Cawnpore Farm. | Has attracted much attention from the common cultivators and Special Managers, Court of Wards Estates: much appreciated by some agriculturists, who have given favorable opinion regarding it after actual trial. | Trials held during the year under report confirm the results reported before, *viz.*, that it can plough an acre of *dumat* land 4 to 5 inches deep in 11 to 12 hours, the width of the furrow being about 7 inches. Sixty-one were sold during the year under report, nineteen given on trial, and one on hire. |
| 7 | Jones' Improved iron plough. | Ploughing and breaking of soil. | Easy draught and simple construction. | Rs. 6-0-0 | Engineering Cycle Company, Cawnpore. | Ditto ... | This plough has been in existence for years, but it was sent to the Farm by Mr. Jones for trial only last year. In construction it is similar to the Kaisar plough. All parts of it are made of wrought iron, except the beam, which is made of wood. Recently a useful improvement has been made by substituting an adjustable iron share for one which used to be rivetted to the sole and the standard. | Not known ... | This implement was tried lately at the Experimental Farm, and from the results of the trial it appears that it can plough an acre of *dumat* land in 16 hours, the width of the furrow being 6 inches at the surface and ½ to ¾ inch at the bottom, and the depth varying from 4 to 4½ inches. |
| 8 | Baldeo balti or water-lift. | Raising water from tank or canal. | The lift is made up of two galvanized iron troughs, each having a valve at the bottom, opening upwards. They are hinged on a wooden beam fixed to the ground at the discharging level, and are raised and let down alternately by a very ingenious arrangement of pulleys and ropes. The lift requires only one bullock and one man to work it. The bullock has to go round and round and not to reverse its motion. | Rs. 57-0-0 | Government Farm, Cawnpore. | Ditto ... | The contrivance is a simple and ingenious one. Specially adapted for irrigation from tank or canal where the depth of water does not exceed 6 feet. | Used in certain Court of Wards Estates and by a few well-to-do cultivators also. | Ten were sold during the year under report. The water-lift has been got patented by the Department on behalf of the inventor, Baldeo. |

## APPENDIX B.

*List of agricultural implements and machines which have been tested at the Government Experimental Farm, Cawnpore, during the year ending 30th September 1899, and of those in use which are reported to have met with more or less marked success*—(continued).

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|
| Number. | Designation of implement. | Use. | Special advantages or instructions. | Price. | Where procurable. | Name and designation of official reporter. | Opinion. | Extent to which used by native agriculturists. | Remarks by official reporter. |
| 9 | Baldeo well water-lift. | Lifting water from wells by bullock power. | This consists of a self-emptying iron bucket having a valve at the bottom and a capacity of about 22 gallons, fastened to a rope passing over a pulley and coiled round a wooden drum which can move freely round a spindle fitted to the top of a wooden shaft sunk in the ground within a short distance of the well. One end of the cattle pole rests on the shaft and can move round the spindle, and to the other end a single bullock is yoked to draw the bucket. The drum can be engaged or disengaged with the yoke by means of a lever, the bullock not having to change its course of motion. The bucket is drawn as the bullock moves, but is let down by simple disengagement of the drum. | Rs. 70-0-0 | Government Farm, Cawnpore. | S. M. Hadi, Esq., M. R. A. C., Assistant Director, Land Records and Agriculture, N.-W. P. and Oudh. | The invention appears to be useful even in its present form, but the inventor is trying to make improvements in the machine. No definite opinion about its utility can therefore be given at present. | Not yet introduced among native agriculturists. | Working with an ordinary bullock this lift was found to raise about 2,500 gallons of water per hour from a depth of 9 feet. |
| 10 | Cawnpore chain pump. | Lifting water from depths ranging from 5 to 35 feet. | Very efficient and useful. | Rs. 40-0-0 to Rs. 60-0-0 according to the length of pipe. | Ditto ... | Ditto ... | For raising water economically with hand power, from depths not exceeding 20 feet. It is an excellent lift. | Is used by many well-to-do cultivators in these provinces | Sixteen were sold, one given on hire and seven on trial during the year under report. Experiments made at the farm prove that this implement raises ordinarily 1,000 to 1,200 cubic feet of water from depths not exceeding 3½ feet, 800 cubic feet of water from a depth 5 feet and 400 cubic feet from 13 to 17 feet in an hour. |
| 11 | Improved Cawnpore double pump. | Raising water from canal or tank by cattle power. | Two Cawnpore 5 or 6 feet chain pumps of 4½ inches diameter are worked by cattle power. It lifts 50 cubic feet of water per minute from a depth of 4½ feet. It is very useful for irrigating large areas from tank or canal. | Rs. 250-0-0 | Ditto ... | Ditto ... | Is very useful and efficient for raising water from depths not exceeding 5 or 6 feet. | The implement being very costly is used by well-to-do cultivators only. | Two were sold during the year under report. |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 12 | R. Hunt's kibbling machine. | For kibbling all sorts of grain. | Light, simple, durable, efficient and labour-saving. | Rs. 35 ... | Messrs. R. Hunt & Co., Earlscone, England. | S. M. Hadi, Esq., M.R.A.C., Assistant Director, Land Records and Agriculture, N.-W.P. and Oudh. | Keeps up the reputation it has acquired in previous years. | Used by many people in these provinces. | Four were sold during the year under report. |
| 13 | Nahan kibbling machine. | For crushing all sorts of grain. | These kibblers are mere imitations of the R. Hunt's kibbler and are of three different sizes. | Rs. 10 to Rs. 25. | Sirmore Factory, Nahan, near Umbala, and Government Farm, Cawnpore. | Ditto ... | The mill is an imitation of the kibbler made by R. Hunt & Co., but inferior in workmanship. | Used by many people in these provinces on account of cheap cost. | Six were sold and one given on trial during the year under report. |
| 14 | R. Hunt's chaff cutter "The Simplex." | For cutting fodder. | Economy of labour, efficiency, durability, rapidity of work, simplicity and lightness. | Rs. 35 ... | Messrs. R. Hunt & Co., England, and Government Farm, Cawnpore. | Ditto ... | Maintains the reputation it has acquired in previous years. | Used by many people in these provinces, and is much appreciated by them. | In a trial held at the farm it was found that the implement could cut 8 maunds of green juar fodder per hour, four men having been employed, two to work at a time and relieved by the other two after every six minutes. Under similar conditions the machine cuts 4½ maunds of dry juar fodder in an hour. Eight were soldduring the year under report. |
| 15 | The Madras harrow. | Harrowing ploughed land and cleaning it of dry weeds and grass. | Strong, durable, simple, cheap and efficient. | Rs. 15 ... | Government Farm, Cawnpore. | Ditto ... | Its work is quite satisfactory ... | It has been in use at Sidapat Farm and has given satisfactory result at the Government Farm, Cawnpore. | According to the power of the cattle used and condition of the soil it har rows from 3 to 4½ acres in a day. Four were sold, and one given on trial during the year under report. |
| 16 | Planet J. R. horse hoe. | Hoeing and cultivating land. | Light, strong and cheap ... | About Rs. 35 | Messrs. Loyd, Lawrence & Co., London, and their agents, T. E. Thomson & Co., Calcutta. | Ditto ... | Is a useful implement for hoeing and for pulverising the soil after it has been ploughed twice to the required depth by an improved plough. | Not used by natives. | This has been found to be a very useful implement and is freely used at the farm to prepare the ground for sowing. |

## APPENDIX B.

*List of agricultural implements and machines which have been tested at the Government Experimental Farm, Cawnpore, during the year ending 30th September, 1899 and of those in use which are reported to have met with more or less marked success.*—(concluded).

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|
| Number. | Designation of implement. | Use. | Special advantages or instructions. | Price. | Where procurable. | Name and designation of official reporter. | Opinion. | Extent to which used by native agriculturist. | Remarks by official reporter. |
| 17 | "Humming Bird" cream separator. | For separating cream from milk. | Easily portable and therefore useful and suitable for camp use and small dairies. | Rs. 220 in Aligarh or Calcutta. | Mr. E. Keventer, Proprietor, Dairy Farm, Aligarh, or Sale-shop No. 6, Clock Tower, Municipal Market, Calcutta. | S. M. Hadi. Esq., M. R. A. Assist.-C., ant Director, Land Records and Agriculture, N.-W.P. and Oudh. | It is simple and substantial, and hardly leaves any butter-fat in the milk. | Not used by natives. | Separates 16 gallons of milk in an hour, but can also be used for separating as small a quantity as one seer of milk. Its weight is only 30lbs. |
| 18 | Babcock's milk tester. | For testing purity of milk. | Simple and useful ... ... | Rs. 25 ... | Dairy Supply Co., Museum Street, London. | Ditto ... | See column 10 ... ... | Ditto ... | Mr. Keventer, Dairy Expert and Proprietor, Dairy Farm, Cherat, Aligarh, reports that he prefers this instrument to all others he has applied before for testing milk, as it gives accurate results and can be used by natives of ordinary intelligence. |
| 19 | Set of cheese making apparatus—<br>(*a*) Cheese tub.<br>(*b*) Cheese press.<br>(*c*) Curd mill. | Cheese manufacture. | Making European cheese in India ... | Rs. 300 ... | Ditto ... | Ditto ... | It is durable, well made and makes fairly good cheese. | Used by R. C. Dutt, Lake Dairy, Naini Tal. | |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 20 | Cunningham butter worker. | Separates water from butter. | Complete separation of butter from water without being touched with the hand. | Rs. 50 ... | Dairy Supply Co., Museum Street, London. | S. M. Hadi, Esq., M. R. A. C., Assistant Director, Land Records and Agriculture, N.-W. P. and Oudh. | Simple, durable, efficient and useful. | Used by R. C. Dutt, Lake Dairy, Naini Tal. | 10lbs. of butter can be worked at a time. |
| 21 | Victoria churn. | For churning cream or whole milk. | Butter can be separated from the cream without being touched with the hand. | Rs. 60 ... | Ditto ... | Ditto ... | Durable and efficient ... ... | Ditto ... | |
| 22 | The Windsor separator. | Ssparating cream from milk. | The cream can be separated immediately after the milk is drawn. | Rs. 450 ... | L. H. Patock 10, Lanie Khela Mand, Bombay. | Ditto ... | Durable and useful in hot climate. Its work is satisfactory at the Cherat Dairy Farm. | Not used by natives. | Separates 4½ maunds of milk per hour. |
| 23 | Laval separator, the "Baby". | Ditto ... | Ditto ... | Rs. 235 ... | Ditto ... | Ditto ... | Ditto ... | Used by R. C. Dutt, Lake Dairy, Naini Tal. | |
| 24 | The Senwai Press. | Making senwai (vermicelli) from wheat-flour kneaded into dough. | Rapidity of work and simplicity of construction. | Rs. 8 ... | Government Farm, Cawnpore. | Ditto ... | Is a good contrivance and useful for making *senwai* from flour kneaded with the hand. | Used by some people of these provinces. | Three were sold during the year under report. |

S. M. HADI,
*Assistant Director, Land Records and Agriculture,*
*N.-W. P. and Oudh.*

# ORDERS OF GOVERNMENT.

No. $\frac{1008}{I-294D}$ OF 1900.

## RESOLUTION.

REVENUE DEPARTMENT.

*Dated Allahabad, the 24th March* 1900.

READ—

Letter No. $\frac{860}{VIII-342}$, dated $\frac{31st\ January}{8th\ February}$ 1900, from the Director of Land Records and Agriculture, being his Report on the Operations of the Department of Land Records and Agriculture, North-Western Provinces and Oudh, for the year ending the 30th September 1899.

OBSERVATIONS.—The report was received on February 9th, a week after it was due. It has been shortened by the omission of details that already find a place in separate reports.

2. The principal work undertaken during the year outside the ordinary duties of the Department was the continuation of the enquiry into the state of the sugar industry, which occupied much of the time of both the Director and his Assistant. The latter also superintended the opening of a depôt at Partábgarh for the supply of improved varieties of seed. A new post of Agricultural Inspector has been created for two years with effect from April 1st, 1899.

3. Continued progress has been made in the training of patwáris and their assistants, and in districts where Survey operations have begun, the schools are closed and teachers and pupils receive practical training in the field. A much higher standard of efficiency is now required of patwáris, and the steps taken to train them in practical surveying are specially satisfactory. The final re-arrangement of patwári circles and salaries in Basti and Budaun was sanctioned by Government, and detailed proposals have been forwarded since the close of the year to the Board of Revenue for the revision of circles in Hardoi and Lucknow, while proposals for other districts are under preparation. In Oudh a considerable additional expenditure will be required in order to raise the pay of patwáris in a few districts to the ordinary scale. Twenty-six patwáris were promoted to higher posts in the Department. There has been no improvement in the stamp of the ordinary candidates for kánúngoships, who are allowed by District Officers to appear at the examinations, and the Director is framing amendments in the rules to ensure that all supervisor kánúngos shall pass through the Agricultural School. There should be no difficulty in securing a sufficient supply of well educated men as candidates from this source. Thirty kánúngos officiated during the year as náib tahsíldárs, and four were selected as approved candidates for the post, but the inferiority of most of the men is a bar to their promotion. The re-organization of the staff of kánúngo inspectors has been sanctioned, and the numbers will be reduced and the pay of those remaining increased as vacancies occur.

4. The arrangements for compiling the elaborate statistics collected by the Land Records staff in such a form as to facilitate their use in

the practical work of district administration are making steady progress. Revised village registers are now complete for seventeen districts, and all pargana handbooks have been published for six of these, the rest being in course of compilation or publication. The staff has also been employed to some extent on agricultural enquiries, and some useful reports were supplied by selected supervisor kánúngos on matters connected with the cultivation of sugar.

5. Chapter IV of the report explains the working of the Department in the scientific enquiries under Imperial control. An area of 3,312 square miles was cadastrally surveyed, almost entirely by patwáris working under Survey officers, and the maps prepared will be used for the standard maps compiled by the drawing office, which has now been placed under the Superintendent of Provincial Surveys. In the Veterinary Department a scheme for utilizing cast mares for mule breeding has been sanctioned, and the first steps taken towards its introduction. Enquiries were made during the year into the cattle disease known as warbles, and into the prevalence of rabies amongst dogs and jackals. The Assistant Agricultural Chemist to the Government of India has prepared a note on the modifications required in the working of the Cawnpore Experimental Farm, and a revised working plan for the Farm, based on this note, is under preparation.

Foreign trade with Tibet and Nepal increased as regards imports; but the exports to Tibet fell off, owing to the cessation of the abnormal exports of grain in the previous year. The trade with Nepal has now fully recovered from the depression of 1896-97. In the case of rail-borne traffic the imports of food stuffs fell off, owing to the excellence of the season; but the decrease was more than made up for by increases in other commodities, especially coal. The export trade rose considerably, owing to large increases in the exports of grain, oilseeds, and sugar.

During the year the first census of cattle, which will form the basis of a quinquennial return of agricultural stock, was taken.

6. Enquiries dealt with under Provincial control are described in Chapter V, with the exception of the Cawnpore Farm mentioned in paragraph 5 above, which is the subject of a separate report. The supply of seed continues to be an important and successful branch of the work of the Department, and, excluding the requisitions of the Agricultural Department in Burma, which were specially large in the preceding year, the weight issued has increased from 38,000 lbs. to 53,000 lbs. A small depôt has been opened in the Partábgarh district, where the seed used is exceptionally poor, and issues were made from it for the crop now being gathered. These measures for the improvement of seed are definite practical steps, from the successful prosecution of which great benefit may be anticipated to agriculture in this country. The Lieutenant-Governor has read with interest the account given of them, and he is certain that no effort will be spared by the Director to make them a success, and to extend the operations of the Department in this direction as far as possible.

7. It has always been recognised that the large Court of Wards estates can give great assistance in the agricultural work of the Department by promoting measures, the success of which has been proved at the Experimental Farm, and by otherwise co-operating. The meetings of Court of Wards Managers held by the Director, which appear to have been distinctly successful, should greatly assist them in deciding in what direction agricultural improvements can best be introduced on their estates. From nineteen districts reports have been received of definite action taken for the supply of better seed and implements and the improvement of stock-breeding. In the Allahabad district, experiments in reclaiming *úsar* were continued. The Meerut Farm does not seem to be of much practical use, such efforts as it shows being chiefly confined to attempts to improve the agricultural stock of the neighbourhood by maintaining at the farm a stud of various animals for breeding purposes. The experiments in cultivation made at the farm are not so far instructive. A special grant of Rs. 3,000 was made by the Government of India to extend the tree-planting operations at the Abbaspur *úsar* reserve, and 6,000 young *babúl* trees have been planted, the larger scale of operations greatly reducing the average cost per tree.

8. The working of the Agricultural School at Cawnpore continues to be successful, and the Director has satisfied himself, by personally conducting the examination in a number of subjects, of the generally satisfactory and practical character of the instruction given. Almost all the students come with the hope of getting admission to Government service; and, until better accommodation is available, it is improbable that pupils, whose object is to qualify for the management of their own estates, will come in any numbers. But in the education of men for the superior appointments on the Land Records' Roll valuable work is being done, and the way prepared for the institution hereafter of an Agricultural College. One student was receiving a course of preliminary instruction before going to the Royal Agricultural College in England.

9. The analysis of districts for the purpose of recording the agricultural defects to which their history shows them to be more particularly liable is now being carried out in the Director's office. The information hitherto received from districts is described as vague and sometimes contradictory. Improvement can be looked for only when the investigation now being made focuses the points on which definite information is required.

10. The Department was in charge of Mr. J. S. Meston for the first two months of the year and of Mr. Moreland for the remainder. An alteration in the conditions of the post of Director was made during the year, so that it may now be held by a Magistrate and Collector or Deputy Commissioner of any grade on his grade pay. The Government notices the usefulness and intelligence with which the work of the Department has been carried on by the Directors and the staff, and also desires to acknowledge the services of the officers engaged in Survey work.

ORDER.—Ordered that a copy of the above resolution be forwarded to the Director of Land Records and Agriculture, North-Western Provinces and Oudh, for information and guidance.

J. O. MILLER,

*Chief Secy. to Govt., N.-W. P. and Oudh.*

# REPORT

ON THE

# Operations of the Dept. of Land Records & Agriculture,

## NORTH-WESTERN PROVINCES AND OUDH

*FOR THE YEAR ENDING 30TH SEPTEMBER 1900.*

*ALLAHABAD:*
North-Western Provinces and Oudh Government Press.
*1901.*

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# ERRATA.

*Report on the Operations of the Department of Land Records and Agriculture, North-Western Provinces and Oudh, for the year ending 30th September 1900.*

PAGE 3—line 4 of paragraph 7. For '1st, April' *read* '1st April.'

„ 3— „ 7 „ For 'reporter on economic products' *read* Reporter on Economic Products.'

PAGE 4—line 10. For '1095' *read* '1109.'

„ 4— „ 9 of paragraph 10. For 'Forty-nine' *read* 'Forty.'

„ 4—lines 1 and 2 of paragraph 13. For 'Sdar' *read* 'Sadr.'

„ 6—line 47. For 'Amin' *read* 'amin.'

„ 8— „ 47. For 'unusally' *read* 'unusually.'

„ 9— „ 16. For 'The river-borne, traffic too," *read* 'The river-borne traffic, too.'

„ „ 36. For 'corps' *read* 'crops.'

„ 10— „ 49. For '*inga dulcis*' *read* '*Inga dulcis*.'

„ 13— „ 15. For 'experrimental' *read* 'experimental.'

„ 15— „ 1. For 'Agriculture' *read* 'Agricultural.'

„ 16— „ 47. For 'leguminus' *read* 'leguminous.'

„ „ 49. For '*Bulltin*' *read* '*Bulletin*.'

Page 2— line 4.
„ 7— „ 11.
„ 11— „ 45.
„ 16— „ 49.
} For 'aerometer' *read* 'aermotor.'

Appendix B, page 21, No. 11, column 6. For 'expermental' *read* 'experimental.'

„ B „ 24, No. 19, „ 8—line 3. For 'comman' *read* 'common.'

# REPORT

ON THE

# Operations of the Dept. of Land Records and Agriculture,

## NORTH-WESTERN PROVINCES AND OUDH,

***FOR THE YEAR ENDING THE 30TH SEPTEMBER 1900.***

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No. $\frac{836}{\text{VIII—390}}$.

FROM

W. H. MORELAND, ESQ.,

DIRECTOR, DEPT. OF LAND RECORDS AND AGRICULTURE,

N.-W. PROVINCES AND OUDH,

To

THE CHIEF SECRETARY TO GOVERNMENT,

N.-W. PROVINCES AND OUDH,

REVENUE DEPARTMENT.

*Dated Lucknow, the 17th January* 1901.

SIR,

I HAVE the honor to submit the annual report on the work of this Department for the year ending the 30th September 1900.

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## CHAPTER I.

### PREFATORY.

2. I held charge of the Department from the beginning of the year until the 11th August 1900, on which date I proceeded to New South Wales on privilege leave, followed by special duty under the orders of the Government of India. Mr. S. H. Fremantle, Settlement Officer of Bareilly, officiated for me in addition to his own duties from the 12th August till the close of the year. The post of the Assistant Director was held by Saiyid Muhammad Hadi, M.R.A.C., M.R.A.S., up to 4th April 1900, when, owing to ill-health he proceeded on leave on medical certificate. The post remained vacant for nearly three months owing to the impossibility of finding an officer with agricultural training, who was at the same time qualified for appointment to the Provincial Service. Eventually the sanction of the Government of India was obtained to the appointment of Mr. P. V. Subbiah, the Principal of the Cawnpore Agricultural School, who has officiated since the 2nd July 1900.

3. I returned to Cawnpore from Naini Tal early in October 1899, halting on the way at Bareilly to examine the record work of the settlement office. The rest of October was spent mainly at Cawnpore, but short visits were paid to Unao to inspect the Abbaspur plantation, and to Lucknow to attend a meeting of the Provincial Service Examination Committee. I proceeded on tour on November 6th and marched through the districts of Cawnpore, Fatehpur and Allahabad. This tour lasted till the middle of January, and during it the land record work of the three districts was inspected in detail and materials collected for the settlement forecasts. A considerable amount of information was at the same time collected on various agricultural subjects, especially on the subsoil-condition of barren land; and before leaving Allahabad I inspected, at the Collector's request, the reclamation

work in progress in the Government estates, and supplied a note of recommendations for future work. Leaving my camp at Allahabad, I went to Lucknow to dispose of some urgent office work, and then proceeded to Meerut where a week was spent in tests of the aerometer. The work of the Demonstration Farm was also inspected, and I returned to Cawnpore after a short halt at Aligarh.

The first half of February was spent at Cawnpore and Lucknow: during this period I met first the Director of the Botanical Department of Northern India, and then the Inspector-General of Forests, and accompanied them over the *úsar* plantations. At Lucknow I met the Director-General of Statistics in order to settle some questions which had arisen in connection with traffic returns. Thence I went to Gorakhpur to inspect two tahsíls under the orders of the Board of Revenue.

On my return from Gorakhpur I was occupied till the end of February in the annual meeting of the Managers of Court of Wards Estates; when this was over, I inspected the work of the staff engaged in the preparation of village registers in Jhánsi, and thence went on to Bánda to arrange for starting the same work there. Returning to headquarters I went to Aligarh to meet the Director of the Botanical Department and accompanied him over the *úsar* experiment station; thence I went to Meerut where I completed the aermotor tests and arranged some difficulties arising in the preparation of the village registers. This work being finished, I returned to Lucknow, whence at the end of March I went to Allahabad to settle with the Superintendent of the Government Press some matters connected with the contract for printing patwári forms. My next journey was to Partábgarh, where the headquarters and tahsíl record work was examined and arrangements made in connection with the issue of improved seed. I next visited Bara Banki at the request of a landowner who consulted me as to the reclamation of some land. I returned to Lucknow on 28th April and on the 30th started for Naini Tal, halting at Bareilly to arrange for the preparation of the village registers.

I left Naini Tal on 2nd July and made my first halt at Sháhjahánpur, where I examined the preparation of the village registers. Thence I went to Bara Banki where I inspected the tahsíl land record work, and made enquiries about some defects in the Arboricultural Department; next I visited Unao to arrange for the season's work at the Abbaspur plantation, and went on to Etáwah where various matters in the Survey department required my attention. From Etáwah I went to Aligarh to hold the Kanúngo examination; thence I proceeded to Saháranpur to dispose of some matters concerning the Botanical Gardens. My next halt was at Bijnor where I inspected the record work at headquarters and at the tahsíli, going thence to Lucknow. The rest of my time up to 11th August when I made over charge was taken up with the remaining Kanúngo examinations.

4. The Assistant Director, Saiyid Muhammad Hadi, visited the Abbaspur plantation twice during the month of October, and frequently inspected the *úsar* reserve at Juhi. In November he again visited the Abbaspur plantation and made some enquiries regarding the *úsar* lands in the districts of Sultánpur and Partábgarh. In December he inspected the Abbaspur plantation three times and went to Partábgarh to purchase and store *kharíf* seeds for the seed depôt. In January he made a tour in the south of Oudh and made enquiries into the local system of cattle breeding and seed supply: the barren lands were also studied. At Rae Bareli he inspected the *nazúl* plantation started last year under the "deep *thala*" system, and sent a note to the Deputy Commissioner embodying instructions with regard to operations to be carried out in future. In February he paid several visits to the *usars* at Juhi and Amramau; and went with the Inspector-General of Forests to Abbaspur where that officer inspected the new *babul* plantation. He then proceeded to Bulandshahr to attend the agricultural show and returned to Cawnpore to make the necesary arrangements for the conference of Special Managers of Court of Wards estates

held towards the close of February. In March he visited the agricultural fairs at Muzaffarnagar and Meerut. While in Meerut he fell ill, and was obliged to go on sick leave.

Mr. P. V. Subbiah while officiating as Assistant Director inspected the Gursikran reserve in July and assisted me in the Kanúngo examination held at Aligarh in the same month. During the remainder of July, August and September he remained at Cawnpore supervising the work in progress there and at the Abbaspur plantation.

5. The Superintendent of Provincial Surveys, Mr. G. B. Scott, visited all the districts under survey during November and December 1899. In January 1900 he personally supervised the training of a class of Junior Civilians, who, after the preliminary course, assisted for a month in checking the work and reporting on the capabilities of the patwaris in portions of Farukhabad, Etah, Etáwah and Mainpuri. After closing the class, the Superintendent made a tour through Mainpuri, Etah and Aligarh, inspecting the patwáris in the field. He then, at the request of the Collector of Bulandshahr, re-demarcated a lost boundary on the Ganges where there was a considerable dispute between the contiguous villages of Bulandshahr and Budaun. He then continued his tour through the Moradabad district, examining the village maps with a view to reporting on the necessity of a re-survey. He next replaced a lost pillar on the Nepál-Almora boundary on the Sardha river, and during April and May again visited all the districts under survey. All the offices were again visited by him in July and August 1900.

6. Captain Coldstream, R.E., Deputy Superintendent, joined the Provincial Surveys on 1st February 1900, and, till the close of field season, was occupied in examining the system of the work in progress in Farukhabad, Mainpuri and Aligarh. He held charge of the traverse and drawing sections during the recess season. In July 1900 he visited the offices in Gonda, Azamgarh, Etáwah and Aligarh, to obtain a knowledge of the office procedure in record writing.

7. The sanction of the Secretary of State has been accorded to the creation of the post of Deputy Director, and the officer selected by him has just joined the Department. The post of Agricultural Inspector, which was created for two years from 1st, April 1899, was sanctioned in November last for one year more, pending the appointment of the Deputy Director. The Inspector, Saiyid Zamin Husain, B. A., has been employed mainly in collecting information and specimens required by the reporter on economic products, but he has also done a fair amount of strictly agricultural work.

## CHAPTER II.

### Land Records Establishments.

8. This chapter refers mainly to the action taken towards the gradual improvement of the land records staff; a detailed note on the whole work of the year has been submitted to the Board of Revenue for incorporation in the Annual Administration Report.

9. *Training of patwáris.*—The number of schools continues to fluctuate according to local requirements. The school in the Lalitpur sub-division, which had been closed, was re-opened during the year, and a proposal to continue it for another year has been submitted to the Board. The schools at Dehra Dún, Mainpuri and Partábgarh were closed owing, in some cases, to the want of candidates and in others to the deputation of pupils and teachers for practical training in surveying.

The total number of patwáris and assistants in the United Provinces (exclusive of Almora, Garhwál, Muzaffarnagar and Sháhjahánpur) was 28,360, of whom 24,914 or 87·86 per cent. have now passed through the school course, against 86·51

per cent. in the preceding year. The number of *patwáris* exempted from examination fell from 2,718 to 2,437, and the number of those who had still to pass from 1,106 to 1,009. The system of simultaneous examinations in all districts has continued in force, and two examinations were held during the year with, on the whole, satisfactory results. In some cases where the marking appeared for any reason to have been unsatisfactory, the papers were again examined, and certain irregularities brought to the notice of the district officers.

Five hundred and thirty-one *patwáris* and assistants attended the schools during the year, of whom 246 passed. In addition to *patwáris* and assistants 3,070 candidates received instruction at the schools, of whom 1,095 passed the examination. One thousand six hundred and twenty-three *patwáris* also received practical training with survey parties.

10. *Prospects of the patwári.*—During the year under report detailed proposals for the revision of patwâris' circles in the Lucknow, Unao, Rae Bareli, Sítapur, Hardoi, Sultánpur and Bara Banki districts were submitted to the Board of Revenue, but no orders have as yet been received. Proposals for the Fyzabad and Partábgarh districts have been returned to the local authorities for further revision. The revision of patwáris' circles in Kheri, Bahraich and Gonda has been deferred till the survey or settlement operations are over. In the North-Western Provinces there have been no material changes in the strength or pay of the patwári staff. Forty-nine patwâris received promotion to higher posts as compared with 26 in the preceding year.

11. *Training of kanúngos.*—Kanúngo candidates were examined as usual during the rainy season: but in view of the approaching change in the rules for recruitment, the examination was limited to candidates who had already passed in some subjects. Thus only 148 candidates appeared as compared with 234 in the preceding year: of these 75 passed in all subjects, 72 passed in part, and one failed entirely. All but 6 of the 75 successful candidates have received practical training in surveying. The amendments to the kanúngo rules regarding the qualification and appointment of kanúngos noticed in the last year's report have received the approval of Government and will be issued immediately. The principal object of this revision is to raise the educational qualifications of Supervisor Kanúngos: and it has been provided that, subject to certain existing claims, this post shall in future be filled by diplomates of the Agricultural School. The selection of Registrar Kanúngos and the rest of the office staff has been made over to district officers, subject again to certain existing claims.

12. *Prospects of the kanúngo staff.*—Four kanúngos were selected as approved candidates for naib-tahsíldárship, and 24 kanúngos received temporary promotion to the post of naib-tahsíldár or to higher appointments during the year, as compared with 30 in the preceding year. For the second year in succession no supervisor has received permanent promotion.

13. *Sdar kanúngos.*—Some time ago my attention was directed to the difficulties in the way of promoting Sdar Kanúngos. Scarcely one of the older men has the examinational qualification required for promotion in the executive line, and their knowledge and experience are lost to the department when they receive appointments as court readers. I proposed therefore, the grant of certain personal allowances to meet such cases, and my proposals have been sanctioned. So far I have granted one allowance: some of the others will be awarded after my cold weather tour, but I intend to require a high standard of conduct and work.

14. *Kanúngo Inspectors.*—No progress has been made in re-organizing the staff of Kanúngo Inspectors owing to the difficulty of providing for the existing staff. I hope, however, that the required opportunity will occur during the present year. The senior Inspector has recently been appointed to officiate as tahsíldár.

## CHAPTER III.

### Utilization of Land Records.

15. This chapter deals with the steps taken to improve the material for the district analysis, in other words the pargana and village registers and the pargana books. During the year under report the revised registers for Meerut, Kheri, Bahraich and the Gurserai Estate of Jhánsi were completed and Pargana hand-books for Bijnor, Budaun, Jhánsi (including the Gurserai Estate), Sítapur, Sultánpur and Bara Banki were published. Most of the pargana hand-books of Gorakhpur, Basti, Fyzabad, Partábgarh and Bahraich are also out, a few that remain being in press. All the pargana hand-books have been prepared for the Meerut and Hardoi districts and will shortly be sent to press. Compilation of village registers is proceeding in the settlement offices of Sháhjahánpur and Bareilly, while the necessary instructions for their preparation have been issued to the Settlement Officers of Farukhabad, Aligarh and Gonda. The special office under my control has been employed in preparing the new registers in Hamírpur and Bánda where settlement operations will not commence for some time.

Thus it will be seen that the new registers have now been provided for the whole of Oudh, except Gonda, where a start will now be made, while hand-books have been printed or are in the press for all except Kheri and Gonda. In the North-Western Provinces, the position is as follows: In Meerut division work is complete in four districts, and will now be begun in Aligarh; Dehra Dún will be taken up when the settlement falls in. The Agra division is just coming under settlement, and the new registers will then be provided. In Rohilkhand new registers have been supplied in Budaun and Bijnor and are being prepared in Bareilly and Sháhjahánpur; Pilibhít, and Moradabad are about to come under settlement. In Allahabad work is finished in Jhánsi and in progress in Hamírpur and Bánda: the settlement of the rest of the division will shortly expire. Gorakhpur and Basti have been supplied, and work is starting in Azamgarh. Only in the Benares division no progress has been made: orders will be separately applied for regarding these districts when the special staff under my orders has completed its work in Bundelkhand.

It would be superfluous to insist on the value of these registers to the district staff, provided they are properly used: and in this respect I am glad to be able to report that the instructions issued last year have produced a real effect, and that the scrutiny of the registers has been more thorough and the enquiry into causes of fluctuations more complete. At the same time fulfilment of the duty imposed on me of supervising the work and calling attention to matters that have been overlooked has been rendered possible by the preparation of registers kept in my office which show all serious fluctuations in the pargana statistics. These registers serve also to record the results of all enquiries into economic and agricultural vicissitudes and their contents will ultimately form the basis of a detailed agricultural history of each separate district. As a beginning of this work the rather meagre information available is being printed in the form of short notes for the information and use of district officers.

16. *Employment of the Land Records staff in agricultural enquiries*—During the year a set of questions on matters connected with the cultivation of *juar* was circulated for report by a selected kanúngo of each district, and several reports of value were received. One such enquiry during the year is as much as can be properly done by the staff in ordinary years; and I do not propose to call for any reports during the present year as the kanúngos have so much extra work in connection with the census.

## CHAPTER IV.

### Scientific and National Inquiry under Imperial Control.

17. **Geography.**—The transfer of the Drawing Section from the control of the Survey of India to the Provincial Surveys has not altered the nature of the work for which it was originally organized, namely, the preparation of cartographical and district maps on standard scales from the revised village maps. As before, these are being prepared on a scale of 2″ to 1 mile for reduction to the 1″ scale for publication.

The method adopted is to calculate the co-ordinate distances of all village tri-junctions and plot them on what are known as quarter sheets, that is, sheets containing 15′ of latitude and 7½′ longitude. Four of these, when reduced, make one standard sheet of the Survey of India Department on the scale of 1″ to one mile. The details of each village map are pentagraphed down from the 16″ to the 2″ scale, traced separately on transfer paper and then entered on the sheets. The cadastral 16″ survey intended for settlement purposes cannot well meet all the requirements of topographical maps. Contours showing the rise and fall of undulating country, intricate details of ravines, and the like cannot be entered without interfering with the lines indicating field limits and omitting the numbers of the fields. There is some difficulty also in selecting the main lines of traffic other than Government roads, and entering these only on the maps. But every care is being taken to do this in consultation with the district authorities. Where large tracts of forests or of hilly or ravined country intervene between cultivation the details are specially surveyed on the 2″ scale.

During the past season blue prints of the Lalitpur Sub-division were received from the Calcutta office for remarks and suggestions by district officers, and were returned for publication. The maps of Sháhjahánpur District were completed, but publication was delayed at the request of the Settlement Officer to enable him to revise the names of villages, the original lists of which were incorrect. This work is now nearing completion, and the maps will be despatched to Calcutta for publication almost immediately. The district maps of Bareilly, Bahraich, Kheri and Meerut are well advanced.

The area cadastrally surveyed was 3,882 square miles and included 4,296,603 separate field numbers. The survey of Pilibhít was completed during the year; work continued in Farukhabad, Azamgarh and Gonda, and was commenced in Mainpuri, Etah and Etáwah. The survey in the last named district has, however, been stopped as it has been decided to extend the settlement. A partial survey was also begun in Aligarh to supply correct maps for the larger villages, of which the boundaries had become seriously distorted. In Aligarh the work had to be done by amíns as the maps were urgently required, and a few amíns were employed in part of Gonda where it was necessary to accelerate the work so as to be ready for the Settlement Officer's inspection; in the other districts there were 1,805 patwáris' circles or portions of circles for survey: in 1,331 of these the survey was done by the patwári himself and in 292 by the patwári's heir. In the remaining 172 circles where the patwáris failed either to qualify or to nominate competent heirs, the survey was done by the candidates under training. In all cases the records were written by the patwári or his heirs. Judged by these figures, the system is a great success: the Amín' has practically disappeared and the field work is done by the patwári, who at the same time receives such training as should enormously increase his efficiency.

18. **Geology.**—The usual returns of the production of minerals in these provinces were submitted to the Director-General of Statistics. At the request of the Board of Revenue a draft of subsidiary rules for the grant of licenses to explore and prospect for minerals in these provinces was drawn up by me after consultation

with the Upper India Chamber of Commerce and submitted for the approval of Government.

19. **Meteorology.**—A detailed record of rainfall and of the maximum and minimum temperatures in the open and under shade is kept at the Cawnpore Experimental station, and the figures have been given in full detail in the appendix to the Farm Report. Detailed records have also been started of the temperature of the soil, a matter however which is perhaps of more importance to us than to the Meteorological Department.

I may here express my acknowledgments to the Meteorological Reporter to the Government of India for the supply of a wind gauge for use in testing the aerometer, and to Mr. J. Murray, Meteorological Reporter in these provinces, for supplying me with the wind-data needed for the same enquiry.

20. **Botany.**—During the year under report Mr. G. F. Duthie, the Director of the Botanical Department, Northern India, inspected the three usar reserves in my company and offered certain suggestions which are being carried out. His report on the usars is already in the hands of the Government. Mr. Duthie again assisted me by examining the students of the Agricultural School in Botany.

21. **Economic Products.**—The Reporter on Economic Products to the Government of India was supplied during the year with twelve sets of articles on various indents received from him.

22. **Veterinary science.**—The year's work of the Civil Veterinary Department has already formed the subject of a separate report. The more important features may be briefly recapitulated.

It has been decided that the staff of the department should ultimately consist of one Inspector for each division, and of two Assistants for each district, the former being paid from Provincial funds, while the latter are provided by the District Boards. As a beginning two Inspectors have been appointed. The number of Assistants had up to the end of March increased to thirty-three, and further progess has since been made. The necessity for a second supervising officer in the department has been recognized by Government, but it has been found impossible to obtain one at present.

No change has taken place in the system under which stallions are provided; but it has been found possible to slightly increase the number at work, and the number of coverings has substantially increased. No great progress has been made in mule-breeding; but the system of issuing cast mares to be used for this purpose, promises to be a great success provided sufficient mares are available; over twelve hundred applications have been received, of which it has been possible to comply with only fifteen.

Cattle disease has been as bad as usual, and little progress has been made towards coping with the ravages of rinderpest. Inoculation was carried out in a few cases with satisfactory results; but the introduction of this method will require very careful supervision at the outset, and little progress can be hoped for until a European officer is available to take the matter up.

No institution for veterinary education exists in the provinces; but two students are sent every year to the Veterinary College at Lahore, their expenses being borne by Government. Two Veterinary Assistants have recently been deputed to the Bacteriological Laboratory to be trained in the methods of inoculation for rinderpest. Elementary instruction in the diagnosis and treatment of the commoner forms of cattle disease continues to be given in the Agricultural School at Cawnpore.

23. **Bacteriology.**—No opportunity has yet occurred for a satisfactory trial of the fungus for exterminating locusts. Some enquiries have been made regarding a contagious virus which is prepared in the Pasteur Laboratory for the destruction of field rats, but no definite results can yet be reported.

24. **Agricultural Science**: (*a*) *Chemistry*—The department as at present organised is not in a position to prosecute chemical researches and is dependent for aid on the staff of the Imperial Department. During the year under report Dr. J. W. Leather, Assistant Agricultural Chemist to the Government of India, assisted the department frequently by his advice. The Farm Report for 1899-1900 was as usual sent to him for review, and the suggestions made by him were incorporated in it. During his visit to the Cawnpore Farm in March last, he carefully examined the whole question of the sugarcane experiments in progress, and sent me a note on the subject, as the result of which it has been decided to continue the experiments with slight modifications for some time longer before attempting to draw conclusions. Dr. Leather also carried out a large number of analyses including samples of all the manures used at the Cawnpore Farm, dung and litter of the animals kept there under different systems of housing, the sugar beets grown at Cawnpore, Saharanpur and Bahawalpur, the raw sugar made from these, and samples of soils from the Cawnpore Farm and the usars.

(*b*) *Mechanical inventions*.—Five applications for leave to file specifications of inventions relating to agricultural machinery were received for report from the Government of India. They were examined by the Assistant Director, who recorded his views as to the novelty and ultility of the projects.

25. **Entomology**.—The Superintendent of the Indian Museum assisted the department by identifying some insects that had attacked the cotton crops of the Cawnpore station.

26. **Statistics**.—Figures were collected and compiled during the year relating to traffic, agriculture, prices and wages, and to the mills and large industries existing in the province. The statistics of traffic have already been reviewed in the annual reports on the Foregin and Inland Trade of the province, and only the most salient features of the year require notice in this place.

(1). *Foreign Traffic*.—The conditions of trade with Tibet were favourable during the year of report; hence imports from this country were higher than in any of the past ten years except the preceding year, 1898-1899, compared with which they showed a drop of 5,702 maunds in weight, but an increase of Rs. 22,615 in value. Borax was imported 2,784 maunds more than in the preceding year, and the total imports of this article, which amounted to 24,407 maunds, were the largest during the past seven years. The imports of salt and wool, which showed increases during the preceding three years, fell off slightly during the year under report. The imports of horses, ponies and mules dropped slightly; but those of cattle, sheep and goats advanced substantially since last year. Exports to Tibet decreased by 5, 336 maunds in weight and Rs. 42,826 in value, owing to smaller despatches of cotton-goods, grain and sugar. The value of silver exported was however more than double that in the preceding year owing perhaps to the system of payment for imports in cash having sprung up in recent years.

Owing to plentiful crops in Nepal, and the high prices obtainable in India the import trade from Nepal shows a further advance on the abnormal figures of the previous year. The imports of grain, which in the preceding year rose by 386,003 maunds, again increased by 57,007 maunds in the year of report. On the other hand imports of oil-seeds fell off by 48,725 maunds, and of timber by 29,720 maunds. Exports to Nepal were also unusally heavy, though there was a slight fall from the figures of the preceding year. The exports of petroleum, provisions (other kinds) and spices were somewhat larger than last year; while those of cotton-goods, salt and sugar showed some falling off from the exceptional figures of the previous year.

(2). *Rail-borne and other traffic*.—The trade of the province was largely influenced by the severe famine which prevailed in the western and central parts of India. The import trade advanced in weight by 53¼ lakhs of maunds or 17 per

cent. and the export trade by 105⅓ lakhs of maunds or 26 per cent. The value in each case rose by over 18 per cent. Grain was brought in much larger quantities than last year for re-export to famine-stricken areas; and *railway plant and rolling stock* and *stone and lime* were imported in connection with the construction of the Ghâziabad-Moradabad and Hardwâr-Dehra-Dûn Railways. The great mortality among cattle in the provinces affected by famine largely raised the imports of *hides and skins*, the greater portion of which was despatched to Calcutta for shipment to Europe. The drop in the receipts of *cotton-goods* and *dyes and tans* follows on the large increase which had taken place in the preceding year, while the decline in the imports of refined sugar is apparently the result of the imposition of countervailing duties. Among the exports the trade in sugar fell off by 6⅔ lakhs of maunds owing partly to short crop in this province, and partly to restricted demand from the famine-stricken provinces, which are ordinarily the principal customers. On the other hand large increases occurred in the despatch of raw cotton and of grain in consequence of the failure of crops in the western and central provinces. The river-borne, traffic too, shows some increase owing to the westerly movement of food stocks on account of the famine. Of the total imports of 20 lakhs of maunds, 12 lakhs were of grain, while the exports consisted chiefly of grain, oil-seeds and sugar. The registration of three years' road traffic in the Meerut Division was completed on 31st March 1900, and the staff was moved in the following April to the Agra Division in compliance with the wishes of the Public Works Department.

(3). *Agricultural statistics and reports on crops.*—Forecast reports on indigo, cotton, *til*, sugarcane, wheat, linseed and rape seed crops, the monthly report on the agricultural prospects of the season and the half-yearly reports on the *kharîf* and *rabi* harvests of 1899-1900 were issued as usual. Crop-cutting experiments with the *kharîf* of 1899 and the *rabi* of 1900 were made in selected districts under the new rules.

With effect from the year under report systematic investigations have, under the orders of Government, been set on foot as regards (1) the relative profit of particular classes of crops, and (2) the comparative cost of flush and lift and well irrigation. Instructions were drawn up by the Board of Revenue in consultation with the Departments of Irrigation and Land Records and Agriculture, and were issued to selected officers. The investigations into the relative profit of particular classes of crops are confined for the present to the profits of the following crops: sugarcane, transplanted rice, wheat sown alone, and barley sown with other corps. The results of the enquiries made during the year under report by the selected officers were forwarded to this department, and were examined by the Officiating Director, who submitted a report on them to the Board of Revenue. His detailed examination of the results of these experiments has, however, showed that some modifications are advisable in the instructions issued last year: these have been submitted since the close of the year.

The returns of agricultural statistics of these provinces for 1899-1900 were submitted to the Director-General of Statistics in November last. Another set of these returns, with a detailed review of them, will be shortly submitted to the Board of Revenue for incorporation in their Revenue Administration Report of the Province. Meanwhile it may be remarked that the cultivated and cropped areas of the province fell off respectively by 611,557 and 1,691,316 acres. The *kharîf* area decreased by 558,207 acres or 3 per cent owing to the heavy and continuous rains of June and July 1899, which hampered sowings, and in lowlands destroyed the seed altogether; while a drop of 1,169,683 acres or 6 per cent. took place in the *rabi* area in consequence of the insufficiency of moisture in the soil at the time of sowing. The deficiency of rain in August and September 1899, and the absence of rain in October, November and December necessitated extensive irrigation from all

available sources with the result that the area irrigated from wells rose by 18 per cent; from canals by 11, and from other sources by 14 per cent.

There is nothing important to report on the other branches of the statistical work of the department.

27. **Forestry.**—As stated last year the Agricultural Department has no concern with forestry proper. The roadside arboricultural operations for the year have already been reported on in detail; the most gratifying feature of the year's operations was the success obtained in many districts in encouraging private persons to plant trees along the roads under the control of the District Boards.

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## CHAPTER V.

### Scientific and Local Inquiry under Provincial Direction.

### SECTION A.—Government Farms.

28. *(i) Experimental Agriculture.*—The experiment station at Cawnpore is the only Government Institution for general agricultural work under the control of this department. The working plan was completed and circulated during the year and is being strictly adhered to. The results of the year's work have been separately reported, and it is unnecessary to recapitulate the experiments in progress. Mention may, however, be made of the results of one series of experiments which has extended over a long period and which has been from time to time criticised as useless. The experiment was directed towards acclimatizing foreign cottons of longer and finer staples than are at present produced in the provinces. Some of the varieties are now thoroughly acclimatized and give heavy yields of a quality which has met with the approval of experts such as Mr. J. N. Tata, the Honourable Mr. Petit, Deputy Chairman of the Bombay Mill Owners' Association, and a Sub-Committee specially appointed by the same Association for the valuation of our produce. I have no doubt that the introduction of some of these varieties would be of direct benefit to the cultivator in some localities: and I am considering in what way this can best be done. The details of the experiment will shortly be published in the form of a bulletin.

Another experiment that has led to definite conclusions is the trial of sugar beet as a field crop. The crop was tried partly at Cawnpore and partly in the Saháranpur gardens, and in both cases the yield was fair. The attempt to make sugar by indigenous processes resulted, as was foreseen, in failure, so that the crop cannot be recommended for cultivation until factories equipped with the necessary machinery are ready to take the produce. Full details of this experiment also will be published in a bulletin as soon as possible.

*(ii) Distribution of seed.*—Seed is now distributed at three main centres, the Cawnpore Farm, the Meerut Demonstration Farm, and the depôt at Partábgarh. The work done at Cawnpore has been detailed in the farm report and requires only brief notice in this place. That the work has to be carried on on a fairly large scale is shown by the fact that over thirty different kinds of seed were supplied, among them 13,000 pounds of maize and 4,000 pounds of oats. A demand has arisen for some of the acclimatized cottons of which over 200 pounds of seed were issued; and many orders have been received for that most valuable fodder, guinea-grass. We have been quite unable to supply the amount of this that was asked for; but I have now planted out some of the ravine land about the farm with this grass, and if, as I hope it thrives there, we shall in a short time be able to meet our indents without difficulty. There is also a large demand for seed of the hedge tree known as *inga dulcis*.

At Meerut Farm the issue is practically confined to Muzaffarnagar wheat, of which 116 maunds have been supplied to cultivators during the year.

The commencement of work at Partábgarh was noticed in last year's report. For last *rabi* a large supply of wheat, carefully selected and cleaned, was issued to landowners in Partàbgarh, much of it being taken by the Court of Wards. The landowners undertook to return the seed at harvest together with *siwai* interest, or, failing this, to pay what was due in cash. The rate of interest may appear to be excessive, but it was fixed after careful enquiries, which showed, on the one hand, that this rate was necessary to defray expenses, and on the other, that it was considerably less than the cultivators were in the habit of paying to private persons for advances of the kind. The engagements of the landowners were honourably met, the only difficulty being that in some cases the tenants preferred to keep all their produce and pay cash. The result of this was that the stock for re-issue was less than it would otherwise have been, and had to be supplemented by fresh purchases: but on the other hand it showed that the superiority of the produce of our seed was quickly recognised. When, however, it came to the time for issuing seed for the current *rabi*, I found that most of the talukdars were unwilling again to undertake the work of distribution; I have not yet been able to visit Partábgarh, and confer with the landowners on this point, and I cannot, therefore, say definitely what are the grounds of their unwillingness; but, so far as I have learned, the principal cause is the amount of work thrown on the staff of their estates. As it was no part of my scheme to obtain unwilling assistance, the issues to landowners in the district have this year been reduced: but the reduction has been more than made good by an extension of the operations under the Court of Wards. The Special Manager in Partábgarh, who has throughout displayed great interest in the scheme, has taken over 500 maunds for the current season, and about 250 maunds has been issued on similar terms to the Special Manager at Lucknow.

On the whole there are at present over 1,300 maunds of seed outstanding, and so far the experiment is as successful as I expected. For the present it is clear that work will lie principally in the larger Court of Wards estates: but it may, I think, be expected that when more time has been given, some of the landowners will see their advantage in coming into the scheme. The season was in some respects unfavourable to the project, as it was on the whole one of marked prosperity, and there was therefore, the less impetus towards undertaking improvements of any kind.

The operations of the year were very materially assisted by a grant from the Government of India, which enabled me to purchase the fresh seed required at a time when prices were so high that it would have been unsafe to invest the borrowed capital, and also to meet the cost of carriage of seed purchased at a distance when the local supply was unsuitable. These extra expenses having been charged off against the special grant, the rest of the operations were conducted without loss: the profit, however, in the first year was only a few rupees.

(*iii*) *Distribution of implements.*—This branch of the department's work is carried on by the staff of the Cawnpore Experiment Station, and has been fully dealt with in its last report. In accordance with the Government of India Circular No. 13-72-16 of 3rd May 1899, a list of agricultural implements and machines tested at the Experimental Farm forms an appendix to this report. The aerometer at the Meerut Demonstration Farm was subjected to an exhaustive series of trials during the year, and the results published in a bulletin for general information. The suitability of the ploughs in use at the farm for hand-draught suddenly became a question of importance owing to the demand for such ploughs for famine districts. A note of the result of the trials carried out was issued to all enquirers and was reprinted as an appendix to the farm report. In our soil the ploughs were practically useless when drawn by hand.

(*iv*) *Boring for wells.*—During the year under report the staff of well-borers consisted of ten trained men, of whom two are on the staff of the department and eight are outsiders, who receive pay only while actually employed. The pay of these

men is borne by the landowners who employ them, and who also pay the freight of the necessary tools, which are lent free of charge. The staff is adequate, but the stock of tools is still insufficient, and fresh purchases will again be necessary. The amount of work done has increased during the year, but we are not yet able to keep pace with the demand for assistance; the popularity of this branch of our work being the best evidence of its value. During the year under report 106 trial borings were made against 83 in the previous year: the total expenditure was Rs. 129-7-1 against Rs. 1,278-9-7, the difference being due to the fact that in the previous year new sets of tools were purchased. More tools will have to be bought during the current year and the expenditure will again rise.

(*v*) *Agricultural shows.*—During the year under report agricultural shows were held at Kakora (Budaun), Bulandshahr, Muzaffarnagar and Meerut. Except the show held at Kakora, where the department was represented by the Agricultural Inspector, all shows were attended by the Assistant Director, who, as usual presided over all the Agricultural Committees and awarded prizes to agricultural exhibits.

The exhibits of improved implements continue to attract many spectators. In the ploughing competition the Watts plough as usual carried off the first prize, while the work of the "Meston" and "Jones" ploughs excited considerable interest with regard to the depth of the furrow and the inversion of the soil. A churn and a three-roller sugarcane mill were exhibited by native artisans at Bulandshahr and were awarded prizes. A model of a water-lift and of a cotton ginning machine invented by a European gentleman were exhibited at the Nauchandi fair at Meerut. The former has been tried at the farm during the year under report, and the results will be reported to Government separately; as to the latter no definite opinion can be given until trials are made on a regular working scale. No other agricultural implements were produced by independent exhibitors in any show. The exhibits of agricultural produce at Bulandshahr were particularly satisfactory ; but the show of cattle was poor as there were fears that fodder would be scarce and expensive.

(*vi*). *Cattle breeding.*—As remarked in previous reports the staff of the department has so far been inadequate to supervise any large scheme of cattle breeding ; and the work that is done is limited to the maintenance of the small stud at Cawnpore and to the supply of bulls when indented for by district officers. During the year under report three bulls of various breeds were issued by the Department, one to the Collector of Mainpuri, one to the Chairman of the Hamírpur District Board, and one to the Jhánsi Grass Farm. Two bulls were kept at Cawnpore for work in addition to some young ones that are being matured. The number of coverings at Cawnpore was 54, out of which 10 are reported to have been successful, and the results in the remaining cases are not known as yet. At the time of the submission of the last report, results of 39 coverings were not known; out of these 28 cows have calved and 11 are reported to have been served unsuccessfully.

## SECTION B.—Private Farms.

29. **On Court of Wards' estates.**—The agricultural work undertaken by managers of estates under the Court of Wards is described at length in a note contributed to the Court of Wards report. Some work was attempted in 15 districts, elsewhere the estates were too small or too poor to provide for any experimental work. Trials of new varieties of crops were carried out in various estates with in some cases satisfactory results. Efforts were continued for the construction of wells and other sources of irrigation, as well as for the provision of necessary drainage works. Bulls were kept in five districts, donkey stallions in two, and a pony stallion in one. The work of the Court of Wards in these matters is necessarily hindered by the absence of a trained staff. During the year proposals were submitted for supplying this want so far as well sinking is concerned, and enquiries are

now on foot as to the possibility of finding an expert willing to take service under the department. For the rest all that can be done at present is to interest the managers in the progress of agricultural work and to bring to their attention such improvements as seem worthy of a trial. With this object I again arranged a meeting of the managers at the Cawnpore Experimental Station in the end of February, and personally explained to them the nature of the work in progress. The meeting was, I believe, profitable to the gentlemen who attended, and certainly it was of advantage to the department, enabling us to realize exactly the directions in which assistance would be most welcome.

30.—**Private farms managed by private individuals or local authorities.**—(1) *The Meerut Demonstration farm.*—This farm is under the control of a Sub-Committee of the Meerut District Board, who have the services of an overseer trained and paid by this department. As the farm receives only a grant of Rs. 1,000 from the District Board, and all other expenses (including the maintenance of a stud) have to be met from the produce, there is no great scope for experrimental work. The farm, however, serves two useful purposes. First it is a demonstration farm where improved implements and newer methods can be seen regularly at work, and as such it receives a fair amount of attention from the cultivators of the neighbourhood. In particular it has demonstrated the manurial value of the sewage from the city drains: this valuable manure was formerly wasted as the cultivators considered it likely to be too stimulating; but as the result of the demonstrations at the farm, there is now, I understand, keen competition for the sewage all round the city. A note describing the success of these trials is under preparation, and when issued, will, I trust, prove useful to other municipalities whose situation is similar to that of Meerut.

The second purpose served by the farm is the maintenance of a breeding stud for the convenience of the public. The stud at present includes an Arab stallion, two donkeys, three bulls, a buffalo, a ram and a goat.

(2.) *Jatau Farm.*—This farm, consisting of 70 acres, belongs to Kunwar Karan Singh, a zamindar of the Agra district. He has been working it with improved implements, and trying experiments with different varieties of wheat and other crops. A practical result of the experiments has been the introduction of Muzaffarnagar wheat in place of the inferior local variety. The farm is doing really good work in the locality.

(3.) *The Lyall Farm at Ujhauli.*—This farm, which had ceased to exist owing to the death of its owner, Chaudhri Sayid-ud-din of Budaun, has been revived during the year. Cotton, indigo, bajra, maize and fodder crops in *kharif* and wheat in *rabi* were tried in the farm, but it is too early yet to pronounce an opinion on the value of the work. I trust, however, that the present owner will persevere in his efforts.

(4.) *Sultánpur Demonstration Farm.*—Kazi Mohammad Taqi, an official in the Deputy Commissioner's office, has started a small demonstration farm in Sultánpur: improved implements have been supplied to him on loan, and good seed has been advanced. This farm may, I believe, if properly managed, be very useful in bringing possible improvements to the notice of cultivators. It is too early as yet to say whether it will be a success; but the Kazi has certainly made a good start and I trust his interest will continue.

## SECTION C.—Agricultural Associations.

31. (1) *The Provincial Agricultural Association.*—No meeting of the Provincial Agricultural Association was held during the year under report. During the spring arrangements were being made for a series of smaller and less formal gatherings of landowners and agriculturists: but the unfortunate illness of the Assistant Director and the unavoidable delay in replacing him made it necessary to abandon this project for the time.

(2) *The Porter Association of Baraun, Allahabad.*—This association appears from the report to be doing useful work in a quiet way. Rae Thakur Mahabir Prasad Narain Singh, Bahadur, the Secretary of the Association, reports that much success has been achieved during the year in cultivating Muzaffarnagar wheat; the area under sugarcane has slightly increased; new wells have been sunk in many villages, and a bund has been constructed as a protection against floods.

(3) *The Bijnor Agricultural Society.* No report of the work of this society has been received.

## SECTION D.—Special Inquiry into Agricultural Defects.

32. The reclamation of barren land continues to be the subject of special investigation, but the programme of the enquiries has been practically exhausted, and I am compiling a note showing the results of the work of the last twenty years. This note will be submitted to Government as soon as complete, and orders will then be taken as to the directions in which enquiries shall be made in future.

Meanwhile, there is no necessity to encumber this report with details of what has been done during the past year. In the direction of cultivation, various rain crops are being tested to determine which is the most suitable for ploughing in on land of which the texture is at present defective: but all other questions of cultivation are practically disposed of. The endeavours to produce a fodder reserve by protecting the indigenous grasses and introducing new ones may be set down as a practical failure, and the present year's experience is in accord with that of the past; while the question of tree-planting cannot be considered as disposed of until the large young plantations now in existence have been watched for some years more.

## SECTION E.—Government Gardens and Miscellaneous.

33. (1) *Saháranpur and Lucknow Gardens.* Full details of the year's work at these institutions have been given in the annual reports already submitted to Government. Despite a somewhat unfavourable season, the income from both gardens more than covered the expenditure, so that a substantial amount of experimental work chiefly in the way of acclimatization was carried out without any expense to Government.

(2) *Mukhtesar Orchard, Kumaun.* This establishment has now been closed and the land made over to the Superintendent of the Mukhtesar Laboratory, from 1st April 1900.

(3) *Khusru Gardens, Allahabad.* The most prominent feature of the year's operations was the increase in receipts which covered the expenditure and left a fair surplus. Much was also done in the way of general improvement in the garden during the year.

(4) *Taj Gardens, Agra.* The services of the Superintendent were dispensed with during the year and Mr. Griessen, a member of the Government staff of trained gardeners, was transferred from Sibpur to fill the post. Under the supervision of the new Superintendent many improvements have been taken in hand.

34. **Lucknow Museum.** The annual report of the Museum Committee, which has already been submitted to Government, gives full details of the year's work. The collections have received further valuable additions during the year and have been carefully maintained. The Deputy Curator has now been placed in executive charge of the institution, general supervision being exercised by Mr. Smith as Curator of the museum.

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# CHAPTER VI.

## Agricultural Education.

35. The record of the year's educational work comprises an account of the Agricultural School and brief notices of a few other matters.

36. **Agriculture School.**—The staff of the school till the beginning of July consisted of the Principal and the two assistant masters. In that month Mr. P. V. Subbiah, the Principal, was promoted to officiate as Assistant Director, and his work was taken by the first assistant master. The vacancy on the staff was filled by Babu Ganga Pershad, a former pupil at the school, who has for some years been working as farm bailiff.

During the year sanction was received to raise the strength of the kanúngo class from 15 to 25 candidates. Accordingly in the class formed in July 25 candidates were admitted into the kanúngo section; while two joined the teacher section; no candidate joined the landowner section. Three candidates failed to join or withdrew, and the class now contains 24 students, of whom 5 are Muhammadans, one Christian and eighteen Hindus. Most of the students admitted during the year possess higher educational qualifications than those of previous years; one has passed the Intermediate Examination, nine the School Final Examination, and the rest the Entrance Examination.

The examination held in April last was conducted mainly by myself: Mr. Duthie again kindly examined in Botany but I was disappointed by the other outside examiners whom I had hoped to secure. The results were quite as good as in previous years: all the ten students that appeared in the examination passed, six being placed in the first and four in the second division.

Each of the senior students that passed out in April last was, as usual, required to cultivate a small plot of wheat, and the outturns obtained were generally good. The system of plot cultivation received much attention during the year, and it is now working to my entire satisfaction. A sufficient number of new plots has been permanently laid out; each senior student will in future have two plots, one to be sown with a *kharif* crop, and the other with a *rabi* crop; the junior students will assist the senior men in field work, but will have no plots of their own to cultivate during the first year's course, as the interruption caused by their deputation to learn survey prevents them from attending to their crops during a large part of the season. A standing rule has been introduced that all ordinary field operations should be done in the morning and evening hours or during holidays, and not, as was formerly the case, at special periods when all lectures were suspended to allow of field work. The Principal informs me that "the system is now working excellently, securing all the advantages of plot cultivation with the minimum of disadvantages found incidental in a course attempting regular theoretical instruction side by side with out-door work."

During the year the curriculum of studies was revised in the light of past experience gained in the practical working of the school, the result being that the students now work in the laboratory during both years of the course, that the first year's course in agriculture is limited to out-door classes, and that more attention and time is devoted during the first year to practical training in surveying at the survey parties and to kanúngo subjects. The full course in this latter subject is not, however, compulsory for students other than the kanúngo candidates.

The students' debating club and reading-room has been working satisfactorily, holding its meetings every Monday evening generally with one of the masters as president. Foot ball and tennis continue to be the principal amusements, the increased numbers and improved physique of the students resulting in a great improvement in the games. Instruction in gymnastics forms a regular part of the school course being given by a properly qualified paid instructor. The riding club maintains three horses, and instruction is given daily to the students.

The insufficient accommodation for boarders referred to in the previous reports is about to be remedied by the extensions to the boarding-house, the construction of which is in progress. The school building was re-roofed during the year, and the opportunity was taken to improve the defective lighting and ventilation.

Having noticed that the health of students living in the boarding-house was not altogether satisfactory, I had the premises carefully inspected last cold weather by the Civil Surgeon of Cawnpore. He recommended certain changes in the alignment of the canal distributaries and some other alterations, and his recommendations have been carried out. The result cannot be judged by the experience of a single year: but it is gratifying to be able to report that the amount of illness during the past autumn was very much less than usual.

37. The question of converting the school into a college or of opening a fresh college is, I understand, still under the consideration of Government.

38. The introduction of agricultural education in primary schools has been the subject of discussion during the year, and it has been decided to begin by providing the necessary instruction in the Moradabad Normal School, to which a demonstration and practice farm will be attached. A competent teacher of the subject has been nominated and is now awaiting the summons to take up his new duties.

39. The candidate, Sheikh Maqbul Husain, B.A., referred to in paragraph 37 of last report, proceeded to England during the year and entered the Royal Agricultural College at Cirencester. The cost of his education there is borne partly by Government and partly by the British Indian Association of Oudh. I have just heard that he has been placed equal first in the December scholarship examination.

40. **The vernacular agricultural journal.**—This journal, which is published by the department monthly, is intended for the circulation of useful information among the educated agricultural public. A small subscription of 14 annas a year (inclusive of postage) is charged to subscribers residing in these provinces, and Re. 1-6-0 to residents of other parts of India. The paper contains twenty pages of printed matter in which agricultural questions of practical utility are discussed. A few copies of the journal are taken by residents in the Panjáb, Bengal, Central Provinces and Rájputána. The number of copies issued during the year under report was 388 against 318 issued in the previous year. The editing of this journal has long been a matter of difficulty, but some advance has been made during the year towards making it more readable; and now that the Deputy Director has been posted to the Department, the Assistant Director will be able to devote more time to the journal, which is undoubtedly capable of improvement.

## CHAPTER VII.

### Publication of Agricultural Information.

41. The usual note on agricultural depression during the year has been contributed to the Administration Report of the Board of Revenue.

42. The system of ledgering economic information in my office has now been brought into working order.

43. No paper has been contributed to the Imperial Agricultural Ledger during the year, but the following bulletins have been published in the provincial series:—

(1) *Bulletin No.* 8—Procedure to be adopted in the systematic examination of varieties of crops, by Dr. J. W. Leather.

(2) *Bulletin No.* 9.—Experiments on the growth of wheat and maize at the Cawnpore Experimental Station, by Dr. J. W. Leather.

(3) *Bulletin No.* 10.—Experiments at the Cawnpore Farm on the growth of wheat *(a)* with green manuring, and *(b)* in rotation with leguminus crops, by Dr. J. W. Leather.

(4) *Bull tin No.* 11.—A note on trials of an aerometer in well irrigation, by the Director.

I have also issued for information.—

(5) the working plan of the Cawnpore Farm; and

(6) A note on the trials of improved ploughs by hand-draught.

Notes or bulletins on the following subjects are under preparation:—

(1) The experience gained at the Cawnpore Experimental Station during the past 13 years in the cultivation of longer and finer stapled cottons.

(2) The cultivation of maize as practised at the Cawnpore Farm.

(3) The experiments carried on in last year in the culture of beet-roots.

(4) The different systems of housing cattle and conserving manure tried at the Cawnpore Experimental Station.

(5) The sewage irrigation of Meerut.

(6) The operations of the Department in the last 16 years towards the reclamation of *usars* and the lessons learnt therefrom.

One other publication may be mentioned in this place, the Monograph on the Sugarcane, drawn up by Saiyid Muhammad Hadi, the Assistant Director. The manuscript of this book was submitted to the Reporter on Economic Products, who recommended a change in the classification of the varieties, and the Assistant Director is making the necessary alterations.

## CHAPTER VIII.

### FINAL.

44. On the subject of the connection of the Department of Land Records with that of Registration, no communication was received other than the Annual Report on the administration of the latter department.

45. In conclusion I wish to place on record my acknowledgments of the good work done by my staff during the year. My personal assistant, Mir Saiyid Husain, has as usual worked to my entire satisfaction: during the period when the post of Assistant Director was vacant he had a great deal of extra work which he performed most creditably and without detriment to his other duties.

Mr. P. V. Subbiah, the Principal of the Agricultural School, had also much extra work thrown on him while the Assistant Directorship was vacant, and his appointment to officiate in the vacancy was a source of much satisfaction to me. His selection has, I am glad to say, been fully justified by results.

The Superintendent of Provincial Surveys desires to place on record his sense of the great assistance he has received from Captain W. M. Coldstream, R.E., the Deputy Superintendent in charge of the Traverse and Drawing Sections, and from the Survey Officers in charge of the different sections of the work. While all have given him much satisfaction, he would specially mention the name of Mr. T. F. Freeman, Deputy Collector, in charge of the Azamgarh survey. I cordially endorse the Superintendent's remarks.

I have the honor to be,

SIR,

Your most obedient servant,

W. H. MORELAND,

*Director.*

# APPENDIX A.

*Statement showing the receipts and expenditure of the Department of Land Records and Agriculture, North-Western Provinces and Oudh, for the financial year* 1899-1900.

| Heads of receipts and charges. | Budget estimate (revised). | Actual. | Remarks. |
|---|---|---|---|
| RECEIPTS. | Rs. a. p. | Rs. a. p. | |
| *Miscellaneous (Provincial) Scientific and other Minor receipts.* | | | |
| Agricultural Department ... ... ... ... | 300 0 0 | 354 14 11 | |
| *Experimental farms and factories.* | | | |
| Experimental Farm ... ... ... ... | 3,500 0 0 | 4,172 3 2 | |
| Workshop and well experiments ... ... ... | 3,500 0 0 | 2,361 0 2 | |
| The Ghazipur Stud Farm lands ... ... ... | 9,057 0 0 | 9,056 15 11 | |
| Reclamation of waste lands ... ... ... | 3,843 0 0 | 4,725 14 10 | |
| | 19,900 0 0 | 20,316 2 1 | |
| Total ... | 20,200 0 0 | 20,671 1 0 | |
| CHARGES. | | | |
| *I.—Detailed Account No. 3, Land Records and Agriculture, North-Western Provinces and Oudh.* | | | |
| Pay of gazetted officers ... ... ... ... | 28,217 0 0 | 28,885 4 9 | |
| Pay of establishment ... ... ... ... | 25,869 10 5 | 25,869 10 5 | |
| Travelling allowance of gazetted officers ... ... | 3,800 0 0 | 3,754 8 6 | |
| Travelling allowance of establishment ... ... ... | 1,300 0 0 | 1,320 1 9 | |
| Contingencies ... ... ... ... ... | 5,811 0 0 | 5,979 4 7 | |
| Traffic registration charges ... ... ... | 23,100 0 0 | 22,729 9 10 | |
| Total ... | 88,097 10 5 | 88,538 7 10 | |
| *II.—Experimental farms and factories.* | | | |
| Pay of establishment ... ... ... ... | 5,230 0 0 | 5,172 15 4 | |
| Conveyance allowance drawn by Assistant Director ... | 300 0 0 | 296 10 8 | |
| Travelling allowance of establishment ... ... ... | 1,090 0 0 | 1,088 4 9 | |
| Supplies and services and contingencies... ... ... | 12,188 0 0 | 11,986 11 1 | |
| Agricultural and kanúngo school (moiety) ... ... | 1,572 0 0 | 1,567 1 1 | |
| Well experiment and workshops ... ... ... | 5,625 0 0 | 5,624 11 6 | |
| Reclamation of waste lands ... ... ... | 5,668 0 0 | 5,664 4 4 | |
| Other agricultural experiments ... ... ... | 2,348 0 0 | 2,346 4 8 | |
| Total ... | 34,021 0 0 | 33,746 15 5 | |
| GRAND TOTAL ... | 1,22,118 10 5 | 1,22,285 7 3 | |

NOTE.—Certified that the receipts in this office were checked in the manner prescribed in G. O. No. 34, dated the 5th October 1882.

W. H. MORELAND,

*Director, Land Records and Agriculture,*

*North-Western Provinces and Oudh.*

## APPENDIX B.

*List of Agricultural Implements and Machines which have been tested at the Government Experimental Farm, Cawnpore, during the year ending 30th September 1900, and of those in use which are reported to have met with more or less marked success.*

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|
| Number. | Designation of implement. | Special use. | Special advantages or instructions. | Price. | Where procurable. | Name and designation of official reporter. | Opinion. | Extent to which used by native agriculturists. | Remarks by official reporter. |
| 1 | Kaisar plough | Breaking land and inverting the soil. | Cheapness, lightness (being only 16 seers in weight). The share can be removed at any time and fitted at will. The iron parts are made of ordinary sheet iron so that repairs can be easily done by ordinary village blacksmith. | Rs. 5 ... | Government Experimental Farm Cawnpore. | Mrs S. M. Hadi, M R.A.C., Assistant Director of Land Records and Agriculture, North-Western Provinces and Oudh. | A good strong soil-inverting plough. It can plough an acre of land in 16 hours, the furrows being 4 to 4½ inches deep and 5 inches wide. | The plough is used by some well-to-do agriculturists in different parts of these Provinces, but is being gradually superseded by the more efficient Watt's plough. | Seven ploughs were sold during the year. |
| 2 | Watt's chain plough. | Ploughing heavy lands and inverting the soil. | Easy draught and adaptable to the various modes of preparing the ground. | Rs. 7 ... (besides cost of chain.) | Ditto ... | Ditto ... | More effective ; stronger and more durable than the Kaisar plough. This implement is in common use at the Government Experimental Farm, Cawnpore, and maintains the reputation it acquired in previous years. It goes from 5 to 6 inches deep in the ground, making a furrow about 9 to 10 inches wide. It ploughs an acre of *dumat* land in a day. | Is specially appreciated and used by several well-to-do cultivators throughout the provinces. Is also often indented for from other provinces. | Twenty-one were sold, three given on trial and two hired. |
| 3 | Watt's beam plough. | Inversion of soil and ploughing heavy lands. | Easy draught and adaptability to the various modes of preparing the ground. No chain is used for working this plough. | Rs. 8 ... | Ditto ... | Ditto ... | Just as No. 2, but used to a smaller extent than No. 2. | Some have been indented for from other provinces, and used chiefly by cultivators in the neighbourhood of Bulandshahr. | Two were sold during the year under report. |
| 4 | Baldeo plough. | Ploughing light soils. | Inversion of soil, simplicity of construction, cheapness and efficiency of work. | Rs. 2-8-0 ... | Ditto ... | Ditto ... | Is suitable for districts in which cattle are small and weak. It ploughs an acre of *dumat* land about 3½ inches deep in a day. | Is used by native cultivators in some places, notably Hardoi and Farukhabad. | Nine were sold during the year under report. |

## APPENDIX B.

*List of Agricultural Implements and Machines which have been tested at the Government Experimental Farm, Cawnpore, during the year ending 30th September 1900, and of those in use which are reported to have met with more or less marked success*—(continued).

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|
| Number. | Designation of implement. | Special use. | Special advantages or instructions. | Price. | Where procurable. | Name and designation of official reporter. | Opinion. | Extent to which used by native agriculturists. | Remarks by official reporter. |
| 5 | The improved Baldeo plough. | Breaking and inverting light soil. | Stronger and more durable than the old Baldeo plough. | Rs. 3-8-0 ... | Government Experimental Farm, Cawnpore. | Mr. S. M. Hadi, M.R.A.C., Assistant Director of Land Records and Agriculture, North-Western Provinces and Oudh. | It is larger and stronger as compared with No. 4; ploughs the soil more efficiently than the old Baldeo plough. An acre of *dumat* land can be ploughed in 16 hours, the width of the furrow being 6½ inches and the depth 4 inches. | Is used and much appreciated by native cultivators. Has been indented for from various parts of India. | Fourteen were sold during the year under report. |
| 6 | The Meston plough. | Breaking and inverting soil. | Strong, durable, light, cheap, suitable for all kinds of soils. Easy of repairs and simple in construction. | Rs. 4 ... | Ditto ... | Ditto ... | This implement has all the good qualities ordinarily desirable in a plough. Its weight is only about 26lbs, and though it is suitable for light soils, it works satisfactorily on clayey soils also. Even the inferior class of bullocks can work it easily. The ploughman has to undergo little exertion in working it. The mould board being made of wrought iron is particularly strong, and the standard and the share which are made of the cast iron are much more substantial than those of the "Improved Baldeo plough." For the price it is the best soil inverting plough among those so far invented at the Cawnpore Farm. | Has attracted much attention from the common cultivators and Special Managers, Court of Wards' Estates: much appreciated by some agriculturists, who have given favourable opinion regarding it after actual trial. | Seventy-six were sold, nineteen given on trial, and one hired during the year under report. |
| 7 | Jones' improved iron plough. | Ploughing and breaking of soil. | Easy draught and simple construction. | Rs. 6 ... | Engineering Cycle Company, Cawnpore. | Ditto ... | This plough has been in existence for years, but it was sent to the farm by Mr. Jones for trial only in 1898. In construction it is similar to the Kaisar plough. All parts of it are made of wrought | Not known. | |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | iron, except the beam, which is made of wood. Recently a useful improvement has been made by substituting an adjustable iron share for one which used to be rivetted to the sole and the standard. | | |
| 8 | The Madras harrow. | Harrowing ploughed land and cleaning it of dry weeds and grass. | Strong, durable, simple, cheap and efficient. | Rs. 15 ... | Government Experimental Farm, Cawnpore. | Ditto ... | Its work is quite satisfactory ... | It has been in use at Saidapat Farm and has given satisfactory results at the Government Experimental Farm, Cawnpore. | Two slod, one given on trial during the year under report. |
| 9 | The Planet J. R. horse hoe. | Hoeing and cultivating land, | Light, strong and cheap ... | About Rs. 35. | Messrs. Lloyd, Lawrence & Co., London, and their agents T. E. Thomson and Co., Calcutta. | Ditto ... | Is a useful implement for hoeing and for pulverising the soil after it has been ploughed twice to the required depth by an improved plough. | Not used by natives. | |
| 10 | Kishengarh hand plough. | Worked with manual labour. | For working with manual labour where cattle are not available, due to famine or other causes. | Not known; can be made for about Rs. 2 to Rs. 3. | Kishengarh Estate. | Mr. P. V. Subbiah, Officiating Assistant Director of Land Records and Agriculture, North-Western Provinces and Oudh. | The inventor writes that he had tilled two bighas of 44 yards square each with three men in one day of ten hours, and the implement was used and liked by the cultivators of the estate. Three men with the plough, one to hold and two to draw, ploughed a soft and previously ploughed soil an extent of $\frac{3}{11}$ acre in nine hours. Depth of ploughing about 2½ to 3 inches. In a soft but unploughed soil the plough simply goes on scratching. Manual labour can be utilized to much greater advantage with the *phaura* in hand. | Not known ... ... | The origin of this plough is in connection with the great loss of the cattle in the last famine, and the desire to use manual labour for tilling the soil. The invention is ingenious, but not likely to be successful. |
| 11 | The Planet, J. R. wheel garden plough. | Originally intended for small gardens. | Can be used successfully for interculture between rows of maize or cotton when about 2 feet apart or more. Earth is thrown on the base of the plants, furrows are made between them, so that all stagnant water is drawn away from them, and the soil is hoed and cleaned by four men working with the tool in two days: one man to hold, two to draw it with a rope and one to follow the tool lifting up plants felled down. The cost comes to about Re. 1-4-0 per acre. | Rs. 10 (13*s.* 6*d.*) | Lloyd, Lawrence & Co. London, or Government Experimental Farm, Cawnpore. | Ditto ... | A useful implement for interculture between maize and cotton. | | |

## APPENDIX B.

*List of Agricultural Implements and Machines which have been tested at the Government Experimental Farm, Cawnpore, during the year ending 30th September 1900, and of those in use which are reported to have met with more or less marked success*—(continued).

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|
| Number. | Designation of implement. | Special use. | Special advantages or instructions. | Price. | Where procurable. | Name and designation of official reporter. | Opinion. | Extent to which used by native agriculturists. | Remarks by official reporter. |
| 12 | The Planet, J. R. double wheel hoe. | Originally intended for increasing the efficiency of manual labour in garden work. | ... | Rs. 20 ... | Lloyd, Lawrence & Co., London, or Government Experimental Farm, Cawnpore. | Mr. P. V. Subbiah, Officiating Assistant Director, Land Records and Agriculture, North-Western Provinces and Oudh. | The draught is too much for an ordinary native labourer, and when used with two men in front, drawing with a rope, the work is unsatisfactory. Not recommended. | | |
| 13 | The Planet, J. R. single wheel hoe. | Ditto ... | ... | Rs. 20 ... | Ditto ... | Ditto ... | The same opinion as above. | | |
| 14 | Baldeo balti or water-lift. | Raising water from tank or canal. | The lift is made up of two galvanized iron troughs, each having a valve at the bottom, opening upwards. They are hinged on a wooden beam fixed to the ground at the discharging level, and are raised and let down alternately by a very ingenious arrangement of pulleys and ropes. The lift requires only one bullock and one man to work it. The bullock has to go round and round and not to reverse its motion. | Rs. 57 ... | Government Experimental Farm, Cawnpore. | Mr. S. M. Hadi, M.R.A.C., Assistant Director of Land Records and Agriculture, North-Western Provinces and Oudh. | The contrivance is a simple and ingenious one, specially adapted for irrigation from tank or canal where the depth of water does not exceed 6 feet. | Used in certain Court of Wards' Estates and by a few well to-do cultivators also. | Eight were sold during the year under report. |
| 15 | Baldeo well water-lift. | Lifting water from wells by bullock-power. | This consists of a self-emptying iron bucket having a valve at the bottom and a capacity of | Rs. 70 ... | Ditto ... | Ditto ... | The invention appears to be useful even in its present form, but the inventor is trying to make improvements in the | Not yet introduced among native agriculturists. | Two were sold during the year under report. |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | about 22 gallons, fastened to a rope passing over a pulley and coiled round a wooden drum, which can move freely round a spindle fitted to the top of a wooden shaft sunk in the ground within a short distance of the well. One end of the cattle pole rests on the shaft and can move round the spindle, and to the other end a single bullock is yoked to draw the bucket. The drum can be engaged or disengaged with the yoke by means of a lever, the bullock not having to change its course of motion. The bucket is drawn as the bullock moves, but is let down by simple disengagement of the drum. | | | | machine. No definite opinion about its utility can, therefore, be given at present. | | |
| 16 | Cawnpore chain pump. | Lifting water from depths ranging from 5 to 35 feet. | Very efficient and useful ... | Rs. 40 to Rs. 60 according to the length of pipe. | Ditto ... | Ditto ... | For raising water economically with hand-power from depths not exceeding 20 feet. It is an excellent lift. | Is used by many well-to-do cultivators in these Provinces. | Fourteen were sold, four on trial, and three on hire during the year under report. |
| 17 | Improved Cawnpore double pump. | Raising water from canal or tank by cattle-power. | Two Cawnpore five or six feet chain pumps of 4½ inches diameter are worked by cattle-power. It lifts 50 cubic feet of water per minute from a depth of 4½ feet. It is very useful for irrigating large areas from tank or canal. | Rs. 250 ... | Ditto ... | Ditto ... | Is very useful and efficient for raising water from depths not exceeding five or six feet. | The implement, being very costly, is used by well-to-do cultivators only. | Two were sold during the year under report. |
| 18 | Martin water-lift. | ... | The inventor's claim is that it can raise four times as much water as an ordinary *charsa* with a pair of working cattle. | Rs. 150 ... | Mr. W. Martin of Agra. | Mr. P. V. Subbiah, Officiating Assistant Director of Land Records and Agriculture, North-Western Provinces and Oudh. | Complicated; liable to get out of order easily, costly to buy and to maintain, and does not compare favourably either with the ordinary single *mhote* or *charsa* or with the double *mhote*. Requires a larger well than what are ordinarily met with in the country, and the strain on the cattle was too great and strikingly brought them down in condition after a few days' work at the lift. An average of many trials gave 274 cubic feet of water per hour at a depth of 13 to 20 feet and 250 to 260 cubic feet of water at depths ranging from 20 to 40 feet. | ... | ... |

## APPENDIX B.

*List of Agricultural Implements and Machines which have been tested at the Government Experimental Farm, Cawnpore, during the year ending 30th September 1900, and of those in use which are reported to have met with more or less marked success*—(continued).

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|
| Number. | Designation of implement. | Special use. | Special advantages or instructions. | Price. | Where procurable. | Name and designation of official reporter. | Opinion. | Extent to which used by native agriculturists. | Remarks by official reporter. |
| 19 | Maize sheller. | Separates maize grain from cobs. | It is found necessary in practice to pass the smaller cobs twice through the machine; and also to have manual labour to pick out with fingers the few grains that are left behind at the tops of the cobs. | Rs. 45 ... | From America. Not known definitely. | Mr. P. V. Subbiah, Officiating Assistant Director of Land Records and Agriculture, North-Western Provinces and Oudh. | A simple and efficient implement for use in places where maize is a comman crop; can shell about 1,100lbs. to 2,000lbs. of grain in a day with four men and three women. The grain is not injured in separation and perfectly good for sowing. The cost of shelling a maund of grain with the machine is less than half of that when the grain is separated in the ordinary country way by manual labour, using fingers and sticks. Another advantage is that cobs that are not dry enough and cannot be dried on account of the rainy weather in September, cannot be shelled with hand, but can be with the machine so as to admit of taking the grain to the market early. | ... ... | ... ... |
| 20 | R. Hunt's kibbling machine. | For kibbling all sorts of grain. | Light, simple, durable, efficient and labour-saving. | Rs. 35 ... | Messrs. R. Hunt & Co., Earlscone, England. | Mr. S. M. Hadi, M. R. A. C., Assistant Director of Land Records and Agriculture. | ... | ... | Five were sold during the year under report. |
| 21 | Nahan kibbling machine. | For crushing all sorts of grain. | These kibblers are mere imitations of the R. Hunt's kibbler, and are of three different sizes. | Rs. 10 to Rs. 25. | Sirmore Factory, Nahan, near Umbala, and Government Experimental Farm, Cawnpore. | Ditto ... | ... | ... | Twelve were sold and one given on trial during the year under report. |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 22 | R. Hunt's chaff-cutter "The Simplex." | For cutting fodder. | Economy of labour, efficiency, durability, rapidity of work, simplicity and lightness. | Rs. 35 ... | Messrs. R. Hunt & Co., England, and Government Experimental Farm, Cawnpore. | Ditto ... | ... | ... | Ten were sold during the year under report. |
| 23 | Hand sieve. | Separates large and plump wheat seed from inferior and small grains. | Consists of sieve with a wooden rim 2½ feet on all four sides and four rings at the four corners. The sieve is hung with four ropes from a roof or a tree, wheat poured in it, and worked forward and backward by a boy. The small grains fall down, the large ones stay behind. | Rs. 2-4-0... | Government Experimental Farm, Cawnpore. | Mr. P. V. Subbiah, Officiating Assistant Director of Land Records and Agriculture, North-Western Provinces and Oudh. | A simple and efficient contrivance, for getting rid of inferior and small grains and securing large, plump wheat seed for sowing. Two men working at the sieve can clean about 15 to 20 maunds in a day. | Introduced only this year... | More than 1,000 maunds of wheat seed have been sifted and cleaned in this way this year in the department for distribution to cultivators. |
| 24 | "Humming Bird" cream separator. | For separating cream from milk. | Easily portable, and therefore useful and suitable for camp use and small dairies. | Rs. 220 in Aligarh or Calcutta. | Mr. E. Keventer, Proprietor, Dairy Farm, Aligarh, or sale-shop, No. 6, Clock Tower, Municipal Market, Calcutta. | Mr. S. M. Hadi, M.R.A.C., Assistant Director of Land Records and Agriculture, North-Western Provinces and Oudh. | It is simple and substantial, and hardly leaves any butter-fat in the milk. | Not used by natives ... | Separates 16 gallons of milk in an hour, but can also be used for separating as small a quantity as one seer of milk. Its weight is only 30 lbs. |
| 25 | Babcock's milk-tester. | For testing purity of milk. | Simple and useful ... | Rs. 25 ... | Dairy Supply Co., Museum Street, London. | Ditto ... | See column 10 ... ... | Ditto ... | Mr. Keventer, Dairy Expert and Proprietor, Dairy Farm, Cherat (Aligarh), reports that he prefers this instrument to all others he has applied before for testing milk, as it gives accurate results and can be used by natives of ordinary intelligence. |
| 26 | Set of cheese making apparatus *(a)* cheese tub, *(b)* cheese press and *(c)* curd mill. | Cheese manufacture. | Making European cheese in India. | Rs. 300 ... | Ditto ... | Ditto ... | It is durable, well-made, and makes fairly good cheese. | Used by R. C. Dutt, Lake Dairy, Naini Tal. | |
| 27 | Cunningham butter-worker. | Separates water from butter. | Complete separation of butter from water without being touched with the hand. | Rs. 50 ... | Ditto ... | Ditto ... | Simple, durable efficient and useful. | Ditto ... | 10lbs of butter can be worked at a time. |

## APPENDIX B.

*List of Agricultural Implements and Machines which have been tested at the Government Experimental Farm, Cawnpore, during the year ending 30th September 1900, and of those in use which are reported to have met with more or less marked success*—(concluded).

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|
| Number. | Designation of implement. | Special use. | Special advantages or instructions. | Price. | Where procurable. | Name and designation of official reporter. | Opinion. | Extent to which used by native agriculturists. | Remarks by official reporter. |
| 28 | Victoria churn. | For churning cream or whole milk. | Butter can be separated from the cream without being touched with the hand. | Rs. 60 ... | Dairy Supply Co., Museum Street, London. | Mr. S. M. Hadi, M. R. A. C., Assistant Director of Land Records and Agriculture, North-Western Provinces and Oudh. | Durable and efficient ... | Used by R. C. Dutt, Lake Dairy, Naini Tal. | |
| 29 | The Windsor separator. | Separating cream from milk. | The cream can be separated immediately after the milk is drawn. | Rs. 450 ... | L. H. Patock 10, Lanie Khela Mand, Bombay. | Ditto ... | Durable and useful in hot climate. Its work is satisfactory at the Cherat Dairy Farm. | Not used by natives ... | Separates 4 ½ maunds of milk per hour. |
| 30 | Laval separator, the "Baby." | Ditto ... | Ditto ... | Rs. 235 ... | Ditto ... | Ditto ... | Ditto ... | Used by R. C. Dutt, Lake Dairy, Naini Tal. | |
| 31 | The Senwai Press. | Making *senwai* (vermicelli) from wheat flour kneaded into dough. | Rapidity of work and simplicity of construction. | Rs. 8 ... | Government Experimental Farm, Cawnpore. | Ditto ... | Is a good contrivance, and useful for making *senwai* from flour kneaded with the hand. | Used by some people of these Provinces | Two were sold during the year under report. |

P. V. SUBBIAH,

*Offg. Assistant Director, Land Records and Agriculture, N.-W.-P. and Oudh.*

# ORDERS OF GOVERNMENT.

No. $\frac{885}{\text{I—250E}}$ OF 1901.

## RESOLUTION.

REVENUE DEPARTMENT.

*Dated Allahabad, the 20th March* 1901.

READ—

Letter No. $\frac{836}{\text{VIII—390}}$, dated $\frac{17\text{th}}{31\text{st}}$ January 1901, from the Director of Land Records and Agriculture, being the Annual Report on the Operations of the Department of Land Records and Agriculture, North-Western Provinces and Oudh, for the year ending 30th September 1900.

OBSERVATIONS.—The report is due to reach Government on 1st February and was punctually received upon that date. During the last two years the report has been considerably shortened by the exclusion of matters dealt with elsewhere.

2. The progress made in recent years in the training of *patwáris* has been satisfactory. Exemptions from the school test are no longer obtained with the same facility as before, and 87 per cent. of the total number have now passed. Any orders that may be required regarding the revision of pay and circles of *patwáris* will be more conveniently passed in the Revenue Administration Report.

3. The improvement of the supervising or *kánúngo* staff is a measure to which the Government attaches much importance, and it has been decided that, subject to certain existing claims, all appointments to supervisor *kánúngoships* will henceforth be made from men who have passed through the course of the Agricultural School. The introduction into the Department of educated men with a special agricultural training must greatly increase its efficiency; and in time it is possible to anticipate the provision of a staff of trained experts in each district capable of dealing not only with the ordinary Land Record work, but to some extent with agricultural enquiries and problems. Four *kánúngos* were selected during the year for a *náib* tahsíldárship, and 24 *kánúngos* were temporarily promoted in that or a higher appointment.

4. Further progress has been made in the measures taken to compile the statistics of the Land Records Department in such a way as to be of use to officers engaged in the practical work of district administration. The new village registers and pargana books have been practically completed for the whole of Oudh, with the exception of the Gonda district; and in the North-Western Provinces the work appears to be as far advanced as the conditions of settlement permit. The Director has also in preparation registers for the record of all serious fluctuations in pargana statistics which are ultimately intended to form the basis of a detailed agricultural history of each district. Several pargana handbooks were also issued during the year, and the Government has enquired separately of the Board as to the manner in which these are utilized by District Officers. It is of the utmost importance to the administration

that District Officers should make themselves acquainted with, and take an interest in, the agricultural and economic condition of the tracts under their charge, and it is for this reason that Government attaches much importance to the careful use and annotation up to date of the books in which the statistics of each village are given.

5. It is satisfactory to learn that, except in some specially situated tracts, the cadastral survey work of the Department was carried out by *patwáris* and not by professional *amíns*.

6. The famine which prevailed in Central and Western India affected in a striking manner the rail-borne and other traffic of the Province. Imports increased by 17 per cent., and exports by 26 per cent. In particular, food stocks were largely imported for re-export to famine districts; and, owing to the mortality of cattle in famine areas, the import of hides for conveyance to Calcutta showed a large increase.

7. The work of the Government Farm at Cawnpore is described in a separate report, that for the past year being an unusually complete and interesting one. The Director in the present report mentions two series of experiments conducted here during the year, which promise to be of value—the acclimatization of superior staples of foreign cotton, and the trial of sugar beet as a field crop. Details of these experiments, which, so far as they went, were successful, are being published in the form of bulletins. The important work of seed distribution was continued at the Cawnpore and Meerut Farms and the Partábgarh Depôt. So far the distribution has been mainly to Court of Wards' estates; but the Director regards the experiment as having been as successful as was to be expected. These experiments are of much interest in connection with the extension of agricultural banks, which may, if they can be successfully established, of which there seems reasonable hope, carry on transactions in grain as well as in cash.

8. The Agricultural School at Cawnpore appears to be doing good work. The restriction of admission to the appointment of supervisor *kánúngos* to diplomates of the School will necessarily add to the numbers of persons seeking admission, and will enable the Director to insist on a high standard of general education in the students before their special agricultural training commences. The question of establishing an Agricultural College is not yet ready for final consideration, but the School is steadily progressing. It has been decided to arrange at the Moradabad Normal School for classes in which some practical training in agriculture will be given.

9. The Department was in the charge of the substantive Director until 11th August 1900, when Mr. Moreland proceeded to Australia to prosecute enquiries in connection with the subject of rust in wheat. Mr. Fremantle, Settlement Officer of Bareilly, officiated as Director during Mr. Moreland's absence. The Director's report is necessarily a mere summary of the work of the Department, all the more important branches of which are dealt with in separate reports; but it is an interesting record of good work, and the Lieutenant-Governor is glad to notice the practical turn which is given, as far as possible, to the agricultural work of

the Department, and the arrangements made by the issue of bulletins to make the results of experiments available to the public. The Department has been very efficiently administered by Mr. Moreland and his Assistants.

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ORDER.—Ordered that a copy of the foregoing Resolution be forwarded to the Director of Land Records and Agriculture, North-Western Provinces and Oudh, for information and guidance.

J. O. MILLER,

*Chief Secy. to Govt., N.-W. P. and Oudh.*

# REPORT

ON THE

# Operations of the Dept. of Land Records & Agriculture,

## NORTH-WESTERN PROVINCES AND OUDH.

*FOR THE YEAR ENDING 30TH SEPTEMBER 1901.*

*ALLAHABAD:*
North Western Provinces and Oudh Government Press.
*1902.*

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# REPORT

ON THE

# Operations of the Dept. of Land Records and Agriculture,

## NORTH-WESTERN PROVINCES AND OUDH,

***FOR THE YEAR ENDING THE 30TH SEPTEMBER 1901.***

No. $\frac{705}{\text{VIII—439}}$.

FROM

W. H. MORELAND, ESQ.,
DIRECTOR, DEPARTMENT OF LAND
RECORDS AND AGRICULTURE,
NORTH-WESTERN PROVINCES AND OUDH,

To

THE CHIEF SECRETARY TO GOVERNMENT,
NORTH-WESTERN PROVINCES AND OUDH,
REVENUE DEPARTMENT.

*Dated Lucknow, the 10th January* 1902.

SIR,

I HAVE the honour to submit the annual report on the work of this Department for the year ending the 30th September 1901. The form and scope of this report is at present under discussion, and therefore no change has been made in the arrangement.

## CHAPTER I.

### PREFATORY.

2. Mr. S. H. Fremantle, Settlement Officer of Bareilly, continued to act as Director in addition to his own duties up to the forenoon of 5th November 1900, when he was relieved by Mr. H. N. Wright. Mr. Wright held charge of the Department up to 17th of December 1900, when I relieved him. Mr. J. M. Hayman, who joined the Department on 2nd January 1901, held the post of Deputy Director up to the end of the year. Mr. P. V. Subbiah, Principal of the Agricultural School, continued to officiate as Assistant Director up to 15th of March 1901, when he was relieved by the permanent incumbent Saiyid Muhammad Hadi, M. R. A. C., M. R. A. S.

3. The staff of the Department has been strengthened during the year; in addition to the newly created post of Deputy Director, an expert in well-sinking has been temporarily appointed; the post of the Agricultural Inspector has been made permanent: two inspectors of village banks were appointed temporarily from the beginning of May, and some minor appointments have also been created.

Mr. G. B. Scott, Superintendent of Provincial Surveys, retired in July and was succeeded by Captain W. M. Coldstream, R. E.

4. During November and December 1900 the Officiating Director, Mr. Wright, inspected the special offices at Jhánsi and Hamírpur, and some branches of land record work in Unao, Gonda, Muttra and Agra. Early in January I visited Allahabad and Lucknow in connection with the preparation of statistics required for the Famine Commission; I then joined my camp at Agra and inspected the Muttra district in detail. From Muttra I marched through parts of Etah and

Aligarh, and then left my camp to attend to urgent work at Lucknow. Rejoining my camp at Budaun I marched on to Pilibhít; this district was inspected for settlement, while routine work was inspected in Budaun and Bareilly, and enquiries made at a large number of centres regarding the condition of the sugar industry. This tour was interrupted by a hurried visit to Lucknow to attend a conference on industrial education. Early in March I attended a conference at Calcutta at the request of the Government of Bengal; I then held the meeting of special managers at Cawnpore and later in the month made a hurried tour through the Bundelkhand districts to ascertain the damage caused by rust, and collect rust-resisting specimens of wheat. I then inspected the agricultural work of the Court of Wards in Partábgarh. In April I inspected the plantation at Abbaspur, the Sadr Kanúngo's office at Agra and the site proposed for the Normal School farm at Moradabad.

In July I again visited Moradabad in connection with the Normal School, and then went to Dehra Dún to collect materials for the Settlement forecast, and to discuss certain questions with the Agricultural Chemist to the Government of India. The rest of the month was for the most part spent at Cawnpore in choosing the land for the proposed Agricultural College and clearing up questions of title that arose in this connection. I also visited Orai where I inspected the survey office and chose a site for a sub-station. During August I inspected land record work in Lucknow, Rae Bareli, Partábgarh, Sultánpur, Fyzabad, Bara Banki, Sítapur and Etáwah, besides conducting the Amíns' examination at Lucknow and Aligarh, and visiting Naini Tál on business connected with the Agricultural College.

5. The Deputy Director made no long tours during the year. In February he visited the Bulandshahr Agricultural Show; in March he investigated the outbreak of rust in Bundelkhand; in June he was summoned to Naini Tál to assist in the preparation of the scheme for an Agricultural College, and thence went on to Muzaffarnagar to investigate the plague of grasshoppers which was injuring the sugarcane over an extensive tract. In July he accompanied me to Orai to select the sub-station and make other enquiries. The rest of his time has been spent mainly at Cawnpore in studying and supervising the experimental work in progress at the experiment station and the Juhi usar station.

6. Mr. P. V. Subbiah, while officiating as Assistant Director, was engaged mainly in inspecting the agricultural work in progress at the various out-stations. During part of the cold weather he was employed, at the request of the Reporter on Economic Products, in accompanying an expert from Fiji round some of the sugar districts, his services being amply repaid by the amount of information and advice he was enabled to obtain. He also attended the agricultural shows at Aligarh, Bulandshahr, Muzaffarnagar and Meerut.

7. The Assistant Director, Saiyid Muhammad Hadi, on his return from leave was first employed in the improvement of our sugar factory at Cawnpore. In the second week of April he proceeded to Amethi in the Sultánpur district to ascertain the prospects of establishing a depôt for the supply of seed in that neighbourhood. From the middle of April to the middle of July he was busy with the work of the seed depôt in Partábgarh, but found time to begin seed distribution in Sultánpur, to hold ploughing demonstrations at Partábgarh, and to supervise the experimental introduction of the improved methods of maize cultivation followed at the Cawnpore Farm. In August he visited the usar reserves at Juhi and Abbaspur and assisted me in conducting the examination of amíns in Lucknow. He also inspected the usar plantation at Rae Bareli; and made enquiries in Oudh districts into the insect pests injurious to crops, and other subjects of interest. September was again devoted to the work of the seed depôt.

8. During the field season Mr. G. B. Scott, the Superintendent of Provincial Surveys, inspected all the parties at work on two occasions, reported on the maps of the Hamírpur district, and personally instructed a class of junior civilians at Farrukhabad. He also personally surveyed certain difficult boundaries in the north of Oudh. In the rains Mr. Scott, in company with the Deputy Superintendent, visited the survey offices in Aligarh, Etah, Farrukhabad and Jalaun, and

handed over charge of his duties to his successor Captain Coldstream, R. E., at Orai on the 30th of July.

9. Captain Coldstream, R. E., Deputy Superintendent, at the beginning of the season arranged the work of the traverse section and in November took over charge of the Mainpuri Survey, the Survey Officer of Mainpuri being temporarily attached to assist the Superintendent in the head camp of the traverse section. Captain Coldstream remained in charge at Mainpuri up to 2nd of July 1901. On taking charge from Mr. Scott during the rains he inspected the offices at Azamgarh, Gonda, Balrámpur, Aligarh, Etah, Farrukhabad and Jalaun, and checked the municipal surveys in Cawnpore and Fyzabad.

## CHAPTER II.

### Land Records Establishments.

10. The subject matter of this chapter has been dealt with in detail in the contribution to the Revenue Administration Report for the year; the steps taken towards the improvement of the Land Records staff are briefly noticed here.

*Training of patwáris.*—Local requirements continue to affect the number of schools. The Lalitpur school was made permanent, while the schools at Azamgarh and Mainpuri remained closed owing to the deputation of pupils and teachers for practical training in surveying. The special class for patwáris, opened in 1891 in the tahsíli school at Etáwah, has been abolished, as the training was found to be inadequate, and a separate patwári school has been established with the Board's sanction. The schools were attended by 4,026 pupils, of whom 1,472 obtained certificates. One thousand one hundred and twenty-nine patwáris received practical training with survey parties. The percentage of patwáris who have now passed through the school course has risen from 87·8 to 88·9. The system of simultaneous examinations started in 1898 has on the whole continued to work satisfactorily. The results reported by districts still need occasional revision, and in some cases the training in practical surveying is still defective. Certain suggestions for improving the work of the schools were formulated during the year and circulated for the opinion of Commissioners and district officers.

11. *Prospects of the patwári.*—The improvement in the position of patwáris in Oudh, which has been under discussion for so many years, has made substantial progress. Revised scales of patwáris' circles and salaries for the Lucknow, Unao, Rae Bareli, Sítapur, Hardoi, Bara Banki and Fyzabad districts involving a net additional expenditure of Rs. 1,020 per annum received the sanction of Government and were introduced from 1st August 1901. Scales for Kheri and Bahraich costing an extra sum of Rs. 29,046 per annum have also been sanctioned after the close of the year. Proposals for the Partábgarh and Sultánpur districts have been submitted to the Board of Revenue, while those for Gonda are awaited from the Settlement Officer. In the North-Western Provinces a scheme for the Sháhjahánpur district was prepared by the Settlement Officer and is under the consideration of the local authorities.

12. *Training of kanúngos.*—No special examinations are now held as candidates for supervisorships are trained at the agricultural school where the regular "kanúngo subjects" form part of the curriculum. The number of admissions to the kanúngo class has been raised to 25, but nominations are so numerous that there would be no difficulty in filling a larger class did the number of prospective vacancies warrant this step. At the instance of the Superintendent of Census Operations the system of deputing kanúngos for practical training in surveying was suspended during the year, as these officials had to bear the brunt of the census in rural localities.

13. *Prospects of the kanúngo staff.*—During the past year one sadr kanúngo was appointed to officiate as tahsíldár for a short period, while 28 kanúngos received temporary promotion as náib tahsíldárs and one was made permanent in the same post. Four kanúngos were selected as approved candidates for náib tahsíldárship. The number of permanent promotions is still disappointingly small.

14. *Sadr kanúngos.*—Two good-conduct allowances were awarded during the year to sadr kanúngos of exceptional merit, and there is no doubt that the offer of these allowances had tended to increased efficiency. More incentive is, however, necessary, and the promotion of one or two sadr kanúngos to tahsíldárships in recognition of good work in supervising the land records work of the district would result in a great improvement throughout the provinces.

15. *Kanúngo Inspectors.*—Two posts of kanúngo inspectors having fallen vacant a partial introduction of the new scheme has been effected, a senior inspector having been appointed on Rs. 150 per mensem. The complete introduction of the scheme must await the occurrence of further vacancies. One inspector was nominated for a tahsíldárship, but his name had to be held over.

## CHAPTER III.

### Utilization of Land Records.

16. During the year revised village registers of Sháhjahánpur, Hamírpur and Bánda were completed, and all the pargana hand-books of Gorakhpur, Basti, Meerut, Fyzabad and Bahraich published. Most of the hand-books of Kheri and Partábgarh are also out; the few that remain are in press. All the hand-books of Sháhjahánpur and Hardoi have been prepared: the former are in press while the printing of the latter has been deferred until the revised assessments are fixed. Compilation of revised village registers is proceeding in the settlement offices at Bareilly and Gonda, and forms have been supplied to Farrukhabad and Aligarh where the work will be taken up this year. Necessary instructions have also been issued to the Settlement Officers of Azamgarh, Bisalpur Tahsíl in the Pilibhít district, and those parganas of Bijnor which are now coming under settlement. The preparation of new registers for the Benares Division by the special office under my control has been sanctioned by the Board of Revenue and the work is being started in Benares and Mirzapur.

17. The systematic utilization of these registers was, like every other branch of land record work, greatly interfered with by the demands made by census operations on the time of officers. In the majority of districts, however, some progress was made in the economic analysis which they are intended to facilitate.

The information obtained by the district staff has been carefully ledgered in my office. The collation of information regarding past years has progressed though not so fast as had been hoped, and the statistical part of my registers has been of great service in enabling me to call attention to marked fluctuations indicating either inaccurate statistics or changes in economic conditions.

18. *Employment of the Land Records staff in agricultural inquiries.*—Assistance was obtained from the land records staff in an inquiry started during the year at the request of the Reporter on Economic Products into the various races of the castor plant grown in the United Provinces and their methods of cultivation.

## CHAPTER IV.

### Scientific and National Inquiry under Imperial Control.

19. **Geography and Survey operations.**—The drawing office continued the preparation of maps of Sháhjahánpur, Bareilly, Pilibhít, Kheri and Bahraich; the maps of Sháhjahánpur have been forwarded to Calcutta for publication, and those of Bareilly are also complete with the exception of a small area in the town, arrangements for the survey of which have been made.

20. The preparation of new cadastral maps and revision of village records continued during the past year in Farrukhabad, Gonda, Azamgarh, Etah and Mainpuri, and commenced in Jalaun. The work in Etáwah, which was begun in 1899, was stopped by order of the Board of Revenue in view of the postponement of the Etáwah settlement, and the party employed in that district was transferred to Jaláun, the survey and record-writing in half of the villages of one tahsíl

being left for completion under the supervision of the local kanúngos. In addition to the above, a number of scattered villages in Aligarh have been surveyed by a detachment of the Etah party.

21. The survey and field record-writing in Gonda, Farrukhabad and Aligarh have been completed during the past season and the two parties employed in Gonda have come under reduction, on the completion of office record work. The Farrukhabad party on closing work has been transferred to Jalaun, where two parties are employed during the current field season. The Aligarh detachment has taken up the revision of existing maps and records in the Jalesar tahsíl of Etah where the existing maps are to be checked and corrected without resurvey. The adoption of this method is new and to some extent experimental, and the work will be watched by the Superintendent himself as far as possbile, with a view to its recommendation in other districts in place of resurvey where the condition of existing maps makes it possible.

22. The total area cadastrally surveyed during the past season is 3,944 square miles, and the total area in which field record-writing was completed is 3,782 square miles. The difference is mostly due to some survey officers having pushed their survey ahead at the expense of the record-writing in order to obviate the necessity for heavy revisions next year to bring the records of each tahsíl to the same date. The Board of Revenue has sanctioned some modifications in the instructions regarding the preparation of maps and records that will, it is hoped, materially lessen the amount of revision that has been required in the year under report. Amíns were employed with my sanction to assist patwáris in Gonda where the programme was expedited by a year, in the alluvial tracts surveyed in Azamgarh and Farrukhabad, in Aligarh, where the patwáris were frequently required by the Settlement Officer, and for the difficult ravined tracts in Jalaun. The total number of amíns so employed was 227. No amíns were employed in Mainpuri or Etah. The total number of patwáris in areas under survey was 1,529; of these 1,129 men qualified, 185 provided heirs, and 113 substitutes were appointed, either by the Collector or the Survey Officer. The substitutes were ordinarily candidates for employment in the Land Records Department and were paid either in whole or in part at the patwáris' expense. Patwáris who worked well were rewarded by being paid at contract rates for excess areas surveyed.

23. In the present year survey and record-writing will be continued in Mainpuri, Azamgarh, Etah and Jalaun. The party in Etah, and one of the two Jaláun parties will close work in the present year, and one of them will probably be disbanded and the other transferred to revise the maps and records in Hamírpur.

24. In addition to the cadastral work described above, large scale surveys were executed in four municipalities at the expense of the municipalities concerned, and the survey of roads in four districts was carried out for the Public Works Department. The amount of supervision that could be given to this work by survey officers is less than is desirable, and the Superintendent has submitted proposals for the formation of a small party to undertake municipal and other non-cadastral surveys in future.

25. Traverse operations were carried out during the past year in Azamgarh, Jalaun, Farrukhabad, Etáwah, Mainpuri, Etah and Aligarh. A total area of 2579·46 square miles was traversed at a cost of Rs. 69,538-9-7. The programme of traverse work for cadastral surveys is now exhausted with the exception of a small area of about 200 square miles in Etah. A small detachment has been retained to complete this, and the remainder of the traverse establishment has reverted to the Survey of India Department to work in Allahabad, where a topographical survey has been started.

26. **Geology.**—During the year under report proposals for the exemption of mines from the operation of the Indian Mines Act 1901 were obtained from the Commissioners of Benares and Kumaun Divisions and forwarded to Government; and the returns showing the production of minerals in these provinces were submitted as usual to the Director-General of Statistics.

27. **Botany.**—The only matter to be noticed under this head is the enquiry into the nature of the rusts that prevail in these provinces. The subject has been taken up by the Deputy Director, but at present the enquiry is only in the preliminary stage. Mr. J. F. Duthie, the Director of the Botanical Department of Northern India, was prevented from inspecting the usar stations during the year.

28. **Economic Products.**—The Reporter on Economic Products to the Government of India was supplied with seven sets of articles on various indents received from him. The most important collections were (1) woollen fabrics from Agra, Mirzapur and Lucknow, and (2) various Indian perfumes obtained from Kanauj, Jaunpur, Ghazipur and Lucknow.

29. **Veterinary Science.**—The year's work of the Civil Veterinary Department forms the subject of a separate report. The strength of the superior staff has remained unchanged, as the Government of India are unable at present to sanction the appointment of a second officer. The number of Veterinary Assistants employed by District Boards increased from 33 to 39. The importance of providing a veterinary staff has repeatedly been urged on local authorities, and it is hoped that the thirteen districts which are still unprovided may shortly see their way to entertain them. Five additional veterinary dispensaries were opened during the year, and one was closed for want of funds. No institution for veterinary education exists in the provinces but two students are sent every year to the Veterinary College at Lahore, their expenses being borne by Government. One Veterinary Inspector and two assistants were deputed to the Bacteriological Laboratory at Mukhtesar and completed a course of training in rinderpest inoculation.

30. **Bacteriology.**—No opportunity has yet occurred for a satisfactory trial of the fungus for exterminating locusts, but reports from other countries appear to indicate that it is not likely to be successful in dry weather. The fungus was tried with negative results on the grasshoppers which attacked the sugarcane crop in Muzaffarnagar, and which were at first thought to be locusts. The virus for the destruction of field rats, mentioned in last year's report, has not been tried as it would not withstand the high temperatures to which it would necessarily be exposed in transit: its price, too, is so high that its general employment would be out of the question.

I have for some time been desirous of initiating the study of the nitrifying organisms of the soils in these provinces, as it appears probable that knowledge of their action would throw much light on many questions of great practical importance. The Imperial Bacteriologist was asked if the study could be taken up in his laboratary but no reply has yet been received. Some samples of soils have been sent to the New South Wales Agricultural Department, the officers of which were anxious to institute a comparison with their soils, and have kindly promised to supply me with a report on the action of the organisms.

31. **Agricultural science**: (*a*) *Chemistry.*—During the year under report the Assistant Agricultural Chemist to the Government of India visited the Cawnpore Farm; the farm report was shown to him before completion and his suggestions incorporated. An enquiry was undertaken into the nature of the brackish well-water found in parts of the Muttra district; the samples collected were analysed by Dr. Leather and interesting preliminary results were obtained. More analyses are, however, necessary.

(*b*) *Mechanical inventions.*—Seven applications for leave to file specifications of inventions, six of which related to agricultural machinery, were received for report during the year from the Government of India, and were examined by the Assistant Director.

32. **Entomology.**—During last hot weather injury to the sugarcane crop by insects was reported from several districts in the Meerut and Rohilkhand Divisions. The insects, which at first were thought to be locusts, were identified at the Indian Museum as a species of grasshopper distinct from the ordinary locust. The Deputy Director visited the Muzaffarnagar district, but after making a long series of experiments was unable to recommend any practical method for destroying the insects in the later stages of development. It appears probable, however,

that if they are taken in hand on their first appearance and before they are fully developed they can be destroyed by driving them against screens and collecting them in trenches. The insects disappeared when the rains set in. During April the Government Entomologist spent some time at the Cawnpore Farm endeavouring to find the moth of the sugarcane borer, and was assisted in his search by the Deputy Director, who has also examined the various pests which from time to time appear on the farm.

33. **Statistics.**—Statistics relating to traffic, agriculture, prices and wages, and the mills and large industries existing in this province were collected and compiled as usual during the year. Detailed figures relating to traffic have already been published and reviewed in the Foreign and Inland Trade reports.

(1) *Foreign traffic.*—The volume of imports from Thibet was almost the same as last year, but the value dropped by nearly 18,000 rupees. Exports to this country increased in weight, but their value was about the same as last year. During the year under report the harvest in Nepal was less favourable than last year, and imports from this country fell off by nearly 1½ lakhs of maunds in weight; their value, however, advanced by 3½ lakhs of rupees. The export trade with this country was the heaviest since 1887-88 and compared with last year it showed an improvement of four lakhs of rupees in value.

(2) *Inland traffic.*—There was a falling off in the total trade of the province owing to the disappearance of famine which prevailed in the preceding year in certain parts of India. The import trade decreased by 17 per cent. in weight and by 7 per cent. in value and the export trade by 9 per cent. in weight, but its value rose by 9 per cent. Imports of grain and pulse, hides and skins, cotton goods and stone and lime fell off largely, while sugar was imported in larger quantities than last year. Exports of grain and pulse were restricted, as also of raw cotton, hides and skins and oilseeds. In the river-borne traffic with Bengal there was an increase in imports which consisted chiefly of grain and partly also of metals, kerosine oil and salts; but in consequence of diminished despatches of grain, oilseeds, sugar and miscellaneous articles of merchandise there was a decrease in the exports. Road traffic was registered in the Agra Division.

(3) *Agricultural statistics and reports on crops.*—Forecasts were issued as usual of the prescribed crops, indigo, cotton, til, sugarcane, wheat, linseed and rapeseed. The list of selected landholders who report on the condition and yield of these crops was revised in consultation with district officers so as to secure an adequate number of regular reporters. Monthly reports on the agricultural prospects and half-yearly reports on the *kharíf* and *rabí* harvests of 1900-1901 were also issued as usual. Results of the experiments made with selected crops in the *kharíf* of 1900 and the *rabí* of 1901 were examined and compiled.

Investigations regarding (1) the relative profit of particular classes of crops, and (2) the comparative cost of flush and lift and well irrigation were continued according to the revised instructions by officers selected by the Board of Revenue. The results of their enquiries forwarded to this Department were examined and a report submitted to the Board. The returns of agricultural statistics of the province for the year 1900-1901 were forwarded to the Director General of Statistics in the month of November last, and a detailed review of the figures has been furnished to the Board of Revenue for incorporation in the Revenue Administration Report of the province.

Much time has been devoted to the collection of materials for the elaborate inquiry into food production and consumption ordered by the Government of India. As regards consumption it was found that *data* were almost entirely wanting and special enquiries were instituted under the orders of Government. Much progress has now been made in the collection of the raw material and it is hoped that the final report will be ready by the time specified.

34. **Forestry.**—The separate report on roadside arboriculture has been abolished; and the number of statements received from districts has been greatly reduced while affording sufficient information for criticism of the work done. A substantial amount of new work has been carried out in most districts, including an

aggregate of over 28 miles of avenues planted by private persons. Working plans are now generally in existence and have been adhered to in most districts, but there are still occasional defects owing to carelessness of the subordinate staff in carrying out the plans. As the system becomes familiar these defects should disappear. Most of the plans which were prepared for five years are now drawing to a conclusion and steps have been taken for preparing fresh plans in plenty of time.

The financial results of the year are highly satisfactory. Provincial roads brought in an income of Rs. 34,842, while the expenditure was Rs. 24,530. On local roads the expenditure was Rs. 66,111 and the income Rs. 59,075; and taking both classes together there was a substantial surplus.

It is unnecessary in this report to call attention to the defects that have been noticed in particular districts; they have been brought to the notice of the District Board or officer concerned.

## CHAPTER V.

### Scientific and Local Inquiry under Provincial direction.

### SECTION A.—GOVERNMENT FARMS.

35. *Experimental agriculture.*—The work under this head is carried out chiefly at the Cawnpore Farm, where the experiments are now conducted in strict accordance with the working plan. The results of the experiments have already been reported to Government, and as no important experiments have closed during the year it is unnecessary to notice the work in detail. The farm is now under the supervision of the Deputy Director.

Arrangements have been made to start systematic wheat breeding on the lines indicated in the report which I submitted to the Government of India on my return from Australia, and operations are now in progress both at Cawnpore and at Orai, where I have taken up a small plot of very inferior land in order to try wheats under Bundelkhand conditions.

36. *Distribution of seed.*—This branch of the Department's business has developed very considerably. The three main centres from which the seeds are distributed are the Cawnpore Farm, the Meerut Demonstration Farm and the Depôt at Partábgarh. The work done at the first named centre has been fully detailed in the farm report already submitted to Government. It may be noted that 28 kinds of seeds were issued from the farm during the year. Excluding the seeds supplied to the seed depôts, 10,300 lbs. of wheat, 7,000 lbs. of oats, 500 lbs. of Jaunpur maize, 525 lbs. of gram, 250 lbs. of huskless barley, and 575 lbs. of potatoes were the chief issues. The demand for acclimatized cotton and for *Inga dulcis* seed was more than could be complied with. At the Meerut Demonstration Farm 110 maunds of cleaned white Muzaffarnagar wheat were distributed among cultivators on the terms offered in Partábgarh, and I understand that the cultivators have recognised fully the advantages obtained from sowing the best seed. In this part of the provinces cultivators should be able to select their own seed and the distribution is made mainly for educative purposes. In Oudh, however, there are difficulties in this course as many cultivators are unable to carry a stock of seed through the hot weather; and the operations in Oudh are on a much larger scale. During the year seed was issued in the Court of Wards estates in Partábgarh and Lucknow, as well as to some landowners in the former district, and arrangements for issue in Sultánpur were made with the District Board, which supplies the funds. In the first two districts about 1,150 maunds of seed were distributed for the last *rabí*. It was an exceedingly rusty year, but it was satisfactory to find by personal inspection that the healthy seed-wheat supplied withstood rust better and gave a much better yield than the local stock. The cultivators whom I saw at harvest time were fully satisfied with the result. Oats were sown in some Court of Wards villages in Lucknow; the cultivators were at first inclined to distrust this new crop, but I hear that having seen the prices to be obtained in Lucknow they are this year sowing much larger quantities. The introduction of this crop on the stiff soils about Lucknow will be a great advantage to the cultivators and I am hopeful that a good start has been made.

37. Not much was done in issuing *kharíf* seed ; the staff at my disposal is limited and it seemed better to employ it in meeting the existing demand for *rabí* seed than to create a demand for *kharíf*. For the current *rabí* operations have extended largely : about 450 maunds of seed have been issued to Court of Wards cultivators in Partábgarh and 220 maunds in Lucknow, in both of which districts the Special Managers have taken up the matter in a thoroughly practical way. Unfortunately other landholders are slow in following the example ; the cultivators want the seed, the landholders themselves are not unwilling to help, and the obstacle appears to be the opposition of the estate staff. This being so, I authorised the Assistant Director to deal direct with the cultivators as an experiment. He informs me that in Partábgarh the cultivators first took samples and tested the germination ; and when this was found to be satisfactory the demand for seed became so great that the whole stock was disposed of in a week, close on 800 maunds being issued. Similarly in Sultánpur about 450 maunds were issued, and the Assistant Director tells me that in Amethi he was mobbed by cultivators as each fresh consignment arrived.

The operations in the first two years have yielded a small profit which is employed in extending operations.

38. *Distribution of implements.*—During the year under report ploughing demonstrations were held in certain villages of the Court of Wards estates in Partábgarh with the result that the cultivators were most favourably impressed with the Meston plough, of which 30 were sold on the instalment system. These ploughs are actually being used by the cultivators and the result of this experiment will be watched with interest. The distribution made from the Cawnpore Farm has been fully described in the farm report. In accordance with the Government of India's Circular No. 1372-16, dated 3rd May 1899, a list of agricultural implements and machines tested at the Government Experimental Farm, Cawnpore, during the year and of those in use which are reported to have met with more or less marked success forms an appendix to this report.

39. *Boring for wells.*—This branch of the Department's work has developed during the year owing to the appointment of a trained engineer to supervise the boring staff and to advise in cases of difficulty. This appointment took effect in June last and applications for advice are coming in as its offer becomes more widely known. Stricter supervision has also brought about an improvement in the work of the boring staff, which has been fully employed. Efforts are now being made to adapt an ordinary auger for boring to moderate depths ; if this project, for which I am indebted to the Deputy Director, proves successful it will enormously cheapen the operation of boring and bring the facilities offered within the reach even of ordinary cultivators.

40. *Agricultural Shows.*—Agricultural shows were held at Kakora in Budaun, Bahraich, Khairabad in Sítapur, Aligarh, Bulandshahr, Muzaffarnagar and Meerut. The last four shows were attended by Mr. P. V. Subbiah while officiating for the Assistant Director, and the first three by other officials of the Department. The Officiating Assistant Director presided as usual over all the agricultural committees at the fairs attended by him and awarded prizes for agricultural exhibits. The samples of agricultural produce exhibited at Bulandshahr were, in number, quality and neatness of arrangement, by far the best ; at the Nauchandi Fair of Meerut they were also good. At Muzaffarnagar and Aligarh, however, the grains exhibited were comparatively inferior. At Bahraich a kind of *juar* named " gulbarga " specially attracted attention as a novelty in these provinces. This variety is said to be suitable for cultivation in the *rabí* as well as of *kharíf* season, and a small quantity of the seed was obtained from the exhibitor and sown experimentally in the Cawnpore Farm. The cattle exhibited at Meerut and Bahraich were superior in quality to those shown at other places. At the Nauchandi Fair a large number of models of different kinds of water lifts and other machines were exhibited by Mr. Martin of Agra, a sugarcane mill and a boiler of improved pattern by the Agent of Messrs. Thomson, Mylne and Company of Behea, a few exhibits by private mechanics of Roorkee and a plough by Mr. Keventer. The water lifts shown are complicated and too costly for the ordinary cultivator.

The Behea Sugar Mill and the boiler, though more expensive than those in ordinary use, are undoubted improvements. A special prize of Rs. 10 was awarded to the plough exhibited by Mr. Keventer. It is a good and neat plough with a steel mould board and share. The demonstration and exhibition of improved agricultural implements by the Department attracted much attention in all the shows. Ploughing matches were held in almost all the shows and in these the Watt's plough invariably carried off the first-prize. The second prize usually fell to the Meston plough ; but at Aligarh was taken by a plough named the Acme, the invention of a Police Inspector. While, however, the superiority of the ploughs is shown to the spectators at such shows, no large extension of their use follows the demonstration.

41. In December 1900 an agricultural exhibition was held at Lahore under the auspices of the Panjáb Zamíndári Association and at the request of the Secretary to the Association some selected implements and seeds were sent for exhibition on behalf of this Department. The implements were generally appreciated and a considerable number were sold, while the show of long stapled cotton led to a demand for seed which we were unable to meet.

42. Much time was given during the year to the preparation of an improved sugar factory the cost of which should not greatly exceed the ordinary Rohilkhand installation, which was formerly efficient enough but has difficulty in competing with the newer processes in vogue in other countries. The factory is now travelling through Rohilkhand under the personal supervision of the Assistant Director, demonstrations being given at the principal centres of the refining trade.

43. *Cattle breeding.*—The stud of bulls maintained at Cawnpore continues to do useful work in the locality. A Khairigarh bull was issued to the Garhwál district and arrangements made for the issue of bulls to a few other districts.

## SECTION B.—PRIVATE FARMS.

44. **On Court of Wards Estates.**—The reports received from districts show that some work in connection with stock breeding or improvement in agriculture was done in Court of Wards estates in twelve districts ; elsewhere either there was no estate under management or the estates were too small or too poor to provide funds for any experimental work. Reports from seven districts have not yet reached me. The details will be given in the note contributed to the Court of Wards report. A meeting of special managers was arranged at Cawnpore in March. A variety of accidents kept away many managers, but those who were able to come derived, I trust, substantial benefit. A much larger and more successful meeting has been held since the close of the year, and I think I may fairly say that as the result of these meetings the old prejudices against the Department have been finally dissipated and that its assistance is now generally welcomed.

45. **Private farms managed by private individuals or Local authorities.** (1) *The Meerut Demonstration Farm.*—The purposes served by the farm have been fully described in the last report and it is unnecessary to recapitulate them this year. The management of the farm has undergone no change during the year. Lala Jainti Prasada, a Meerut gentleman on the sub-committee controlling the farm, takes much interest in its working, and is constructing a building at his own expense for storing agricultural implements offered for sale. During the year under report experimental cultivation was carried on on about 10 acres of land, the remaining area being devoted to profitable farming. The programme of experiments is drawn up by the Assistant Director ; the results are interesting and will be published when the experiments are further advanced. The Farm maintains a small stud comprising an *Arab* stallion, three bulls of different breeds and some other animals kept for breeding purposes. The stud is much appreciated by the neighbouring breeders and cultivators.

(2) *Jatau Farm.*—Kunwar Karan Singh, an intelligent landholder in the Agra district, is the owner of this farm. It extends over an area of 70 acres and

is worked by improved agricultural implements. The proprietor devotes his attention specially to trials of different varieties of crops, and as the result of his experiments he has introduced Muzaffarnagar wheat in the neighbourhood. I was prevented from visiting the farm last year, but I understand it is doing useful work.

(3) *The Lyall Farm at Ujhauli.*—I mentioned in last year's report that this farm had been revived, my authority being a detailed report received under the signature of the proprietor. On visiting the farm, however, I found that the report was entirely false having been submitted by the estate agent for his own purposes. The land formerly occupied by the farm is let to tenants and no experiments or demonstrations are carried on.

(4) *Sultánpur Demonstration Farm.*—This small farm is managed by Kazi Muhammad Taki, an official in the Deputy Commissioner's Office, who takes a real interest in it. The land is of poor quality and the water-supply is seriouly deficient, but it will be useful as a demonstration farm, when the soil has been got into better order.

## SECTION C.—AGRICULTURAL ASSOCIATIONS.

46. *The Provincial Agricultural Association.*—No meeting of the Provincial Agricultural Association was held during the year under report.

*The Porter Association of Baraun, Allahabad.*—This Association, of which Rai Mahabir Prasad Narayan Singh Bahádur is the Secretary, does not appear to have held any meeting during the year under report. Referring to the agricultural work done by the Association the Secretary reports that the area under sugarcane is increasing year by year owing to the continued efforts made by the Association for the extension of irrigation and the introduction of Behea Sugar Mills. Muzaffarnagar wheat which was distributed by the Secretary to his tenants is reported to have done better than the local varieties. Articles on agriculture published in the Agricultural Journal are brought by the Secretary to the notice of cultivators.

No communication has been received from the Bijnor Association. During my visit to Budaun some gentlemen living in that town expressed their wish to found a local association. I explained to them the way to proceed, urging the need for practical work, but I fear my suggestions were not acceptable as none of them has been carried out.

## SECTION D.—SPECIAL INQUIRY INTO AGRICULTURAL DEFECTS.

47. Two years ago I found that the programme of operations on the usar stations at Juhi and Gursikran was practically exhausted, but when I set to work to prepare a further programme I was met by the difficulty that the results of past work had never been brought together and in some cases were not to be found. It became necessary, therefore, to work systematically through the records of twenty years and ascertain what had been done. This rather tedious work was completed during the year under report and the results are embodied in a report contributed to the Agricultural Ledger, which brings the account of the work up to date, and indicates the programme of work for the future. A start has been made in carrying out the new programme and the results will be recorded in future reports, but at present there is nothing to say that is not incorporated in the ledger.

The babúl (*Acacia arabica*) plantation at Abbaspur has certainly suffered during the year, a change for the worse between July and October being noticeable. The *mohwa* (*Bassia latifolia*) plantation at Juhi on the other hand shows distinct improvement, the majority of the young trees being healthy and vigorous.

## SECTION E.—GOVERNMENT GARDENS AND MISCELLANEOUS.

48. (1) *Saharánpur and Lucknow Gardens.*—Full details of the year's work have been given in the separate reports, and it would serve no useful purpose to recapitulate them in this place.

(2) *Khusro Gardens, Allahabad.*—The gardens have much improved under the good management of Mr. Davies, the Superintendent.

(3) *Taj Gardens, Agra.*—Here also very great improvements have been effected under Mr. Griessen, the new Superintendent.

(4) *Cawnpore Memorial Gardens.*—A proposal submitted by me that these gardens should be placed under the charge of a member of the Indian Gardening Service has been accepted, and it is hoped that the condition of the gardens will in a short time greatly improve.

(5) *Lucknow Museum.*—The annual report of the Museum gives all necessary information regarding its management during the past year. The Department has suffered a great loss by the recent sudden death of Mr. E. W. Smith, the Curator.

## CHAPTER VI.

### Agricultural Education.

49. The staff of the Agricultural School has been subject to numerous changes. The principal officiated as Assistant Director for nearly six months of the year, and very shortly after his reversion was compelled by ill-health to proceed on long leave. The first assistant master, who acted as principal in the early part of the year, fell ill in January last and took three months' leave, but his health broke down again in July. For most of the year, therefore, the school has been in charge of the second assistant master, who is assisted by two diplomates of the school. In view of the frequent changes thus necessitated it is satisfactory to be able to say that the recent report of the Inspector of Schools is on the whole the most favourable that has yet been received, and that the school is in a thoroughly prosperous condition. The examination in April last was held by the staff of the Department, and the whole class succeeded in passing. The new class admitted in July consists of 24 kanúngo candidates, four students who are training as teachers, and two landholders who are qualifying for the management of their estates and not for Government service. The total number of students in residence is now 55. No change has been made in the curriculum indicated in last year's report which is found by experience to be satisfactory.

50. The class rooms and especially the laboratory are by no means suitable, but the question of their improvement depends on the decision as to the establishment of an agricultural college. The boarding-house was extended during the year but the accommodation is still insufficient for the increasing number of students. A reading room has also been built and is just ready for occupation. It is satisfactory to note that the close attention paid during the last three years to the sanitation of the premises has resulted in a distinct improvement in the average health of the students.

51. Many of the diplomates are now employed as kanúngos and the great majority of them are highly spoken of. There is a demand for the diplomates for employment in other provinces, while of late applications from landholders for the services of diplomates have begun to come in. At present the demand is greater than I have been able to supply.

52. The question of developing the school into a college was raised during the year, and under the orders of Government the Director of Public Instruction and myself prepared a scheme for this purpose, which was generally approved. No orders on it have been received at the time of writing.

53. A class in agriculture was opened at the Moradabad Normal School in July last; a diplomate of the Agricultural School has been appointed instructor and a practice farm has been established near the school. It would be premature to offer any opinion on the work of the past few months, which is necessarily tentative.

54. At the request of the Educational Department a series of notes on the principal crops has been drawn up for the use of village school masters in their object lessons. The notes are now being translated.

55. A student holding a Government scholarship is at present reading in the Royal Agricultural College at Cirencester. The reports of his progress that have reached me continue satisfactory.

## CHAPTER VII.

### Publication of Agricultural information.

56. The usual note on agricultural depression has been contributed to the Administration Report of the Board of Revenue. The system of ledgering economic information in my office was continued.

57. A detailed examination of the experimental work of the Department on usar has been contributed to the Imperial Agricultural Ledger during the year, and its publication is expected shortly. The following bulletins were published in the provincial series:—

(1) Bulletin No. 12.—Irrigation wells in the western portion of the North-West Provinces of India by Mr. E. A. Molony, C. S., Collector of Ghazipur.

(2) Bulletin No. 13.—Cultivation of sugar beet in North India.

(3) Bulletin No. 14.—Different systems of housing cattle and conserving manure.

(4) Bulletin No. 15.—The cultivation of longer-stapled cottons at the Cawnpore Experiment Station.

(5) Bulletin No. 16.—The cultivation of maize at the Cawnpore Experiment Station.

(6) Bulletin No. 17.—A note on agricultural improvements suitable to the North-Western Provinces and Oudh.

(7) Bulletin No. 18.—Use of town drainage as manure.

Bulletins Nos. 13 to 16 are the work of Mr. Subbiah, Principal of the Agricultural School; Nos. 17 and 18 were written by myself.

58. The issue of the monograph on the sugarcane drawn up by Saiyid Muhammad Hadi, Assistant Director, was delayed by the necessity for revising the classification of canes adopted. It is now in the press and will be issued shortly.

59. The Agricultural Journal which is published in Urdu under the name of Mufid-ul-Mazarain circulates in these Provinces and in other parts of India, particularly in the Punjab where it appears to be popular. The circulation varies between 350 and 400 copies a month. Endeavours continue to make the tone of the journal more popular and some success has been attained in this direction, but the amateur journalist must necessarily work at a disadvantage.

60. With a view to bring practical improvements in agriculture to the notice of a larger public than can be reached by our present methods of publication, it has been decided to follow the example of Agricultural Departments in other countries by issuing a series of popular leaflets distinct from the present series of bulletins. These leaflets will be issued in Urdu and Hindi, not at fixed periods but when we have anything that could usefully be printed, and will be distributed gratis among the large number of correspondents of the Department who will be asked to make them as widely known as possible; and they will be supplied to the vernacular press with permission to reproduce them in their columns. The large amount of correspondence during the latter part of the year has prevented my preparing any popular bulletins as yet, but I hope shortly to find time for this work. The necessity for extreme simplicity of language makes the preparation a matter of some labour.

## CHAPTER VIII.

### Miscellaneous Matters and Conclusion.

61. No communication other than the annual report on the administration of the Registration Department was received from that department, and no suggestions or comments as to the connection of the two departments were submitted by me.

62. During last cold weather Mr. H. Dupernex, I. C. S., was placed on special duty under Government in connection with the establishment of village banks, and as the result of his work, orders were issued to district officers to arrange for the opening of a few banks in each district. At the same time two inspectors were appointed to advise and assist the managers of the banks and were placed under my general control. These inspectors have been employed during the year in visiting those districts where banks had been started or were about to be started, and they have been of much assistance to district officers. No statistics of the number of banks at work have been collected, and it is unnecessary for me to discuss the result so far attained. My position in connection with the banks is that of an adviser only. I must not omit to express my acknowledgments to Mr. Dupernex, who very kindly supplied the inspectors with the preliminary instruction they required.

63. Attempts were made during the year to encourage the Rohilkhand export trade in hemp fibre, which has largely developed as the result of short supplies from the principal hemp-producing countries. A leading firm in the trade assures me that if the quality of the hemp can be kept good it will secure a permanent place in the European market, an object worth striving for. The obstacles are careless preparation and wilful adulteration. To deal with the first, simple instructions were issued for the use of cultivators through the land records staff, while the services of local municipalities and of the executive were sought to secure combined action by the brokers against adulteration. The immediate effect was satisfactory but its permanency is doubtful.

64. A complete account of the work of the Department must include a brief notice of the correspondence carried on with individual agriculturists. Applications for advice or information are received on a large variety of subjects, not always strictly agricultural, and every endeavour is made to supply what is required; the Assistant Director is specially in charge of this branch of the work of the Department.

65. In conclusion I may be permitted to express my acknowledgments of the good work done by my staff during the year. The services of the agricultural officers have been mentioned in their proper place, but acknowledgment is due also to Mir Saiyid Husain, who, as my Personal Assistant, is responsible for the punctuality and accuracy of the whole statistical department besides affording me great assistance in various other branches and controlling the whole of my large office.

66. I would also bring to notice the good work done by the survey officers, particularly Mr. T. F. Freeman, the officer in charge at Azamgarh, and Mr. N. Bedford who has reverted to the Survey of India Department on the completion of his work in Gonda.

I have the honour to be,

Sir,

Your most obedient servant,

W. H. MORELAND,

*Director.*

## APPENDIX A.

*Statement showing the receipts and expenditure of the Department of Land Records and Agriculture, North-Western Provinces and Oudh, for the financial year* 1900-1901.

| Heads of receipts and charges. | Budget estimate (revised). | Actual. | Remarks. |
|---|---|---|---|
| RECEIPTS. | Rs. a. p. | Rs. a. p. | |
| *Miscellaneous (Provincial) scientific and other minor receipts.* | | | |
| Agricultural Department ... ... ... | 400 0 0 | 362 7 0 | |
| *Experimental farms.* | | | |
| Experimental farm ... ... ... | 4,500 0 0 | 5,436 13 11 | |
| Workshop and well experiments ... ... | 3,000 0 0 | 3,236 10 9 | |
| The Gházipur Stud Farm lands... ... ... | 9,000 0 0 | 9,057 0 0 | |
| Reclamation of waste lands ... ... .. | 4,000 0 0 | 3,641 12 6 | |
| Total ... | 20,500 0 0 | 21,372 5 2 | |
| GRAND TOTAL ... | 20,900 0 0 | 21,734 12 2 | |
| CHARGES. | | | |
| *I.—Detailed Account No. 3, Land Records and Agriculture, North-Western Provinces and Oudh.* | | | |
| Superintendence— | | | |
| Salaries ... ... ... ... | 29,496 0 0 | 28,828 8 0 | |
| Establishment ... ... ... ... | 27,230 0 0 | 26,696 10 1 | |
| Allowances ... ... ... ... | 4,918 0 0 | 4,239 3 0 | |
| Contingencies ... ... ... ... | 6,155 0 0 | 5,980 10 7 | |
| Total ... | 67,799 0 0 | 65,744 15 8 | |
| *II.*—26. *Scientific and other Minor Departments, &c.* | | | |
| A. Experimental farms— | | | |
| Establishment ... ... ... ... | 5,170 0 0 | 4,950 9 1 | |
| Allowances ... ... ... ... | 1,380 0 0 | 1,254 5 2 | |
| Supplies and services ... ... ... | 10,734 0 0 | 10,727 14 9 | |
| Contingencies ... ... ... ... | 681 0 0 | 677 6 2 | |
| Agricultural and Kanúngo School (portion) ... | 3,402 8 0 | 3,388 5 1 | |
| Total ... | 21,367 8 0 | 20,998 8 3 | |
| B. Agricultural experiments— | | | |
| Reclamation of waste lands ... ... ... | 8,000 0 0 | 7,992 2 7 | |
| Well experiments and workshops ... ... | 5,000 0 0 | 4,741 4 0 | |
| Agricultural shows ... ... ... ... | 750 0 0 | 753 5 9 | |
| Crop experiments ... ... ... ... | 100 0 0 | 50 1 3 | |
| Miscellaneous experiments ... ... ... | 2,465 0 0 | 1,464 10 1 | |
| Total ... | 16,315 0 0 | 15,001 7 8 | |
| Registration of Traffic— | | | |
| Registration of Railway traffic ... ... ... | 5,888 0 0 | 5,888 0 0 | |
| Registration of river-borne traffic ... ... | 1,614 0 0 | 1,541 5 9 | |
| Provincial statistics ... ... ... ... | 16,698 0 0 | 16,523 7 11 | |
| Total ... | 24,200 0 0 | 23,952 13 8 | |
| GRAND TOTAL ... | 1,29,681 8 0 | 1,25,697 13 3 | |

NOTE.—Certified that the receipts in this office were checked in the manner prescribed in G. O. No. 34, dated the 5th October 1882.

W. H. MORELAND,

*Director, Land Records and Agriculture,*
*North-Western Provinces and Oudh.*

APPEN

*List of Agricultural Implements and Machines which have been tested at the Government*
*those in use which are reported to have*

| 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|
| Number. | Designation of implement. | Special use. | Special advantages or instructions. | Price. | Where procurable. |
| 1 | Kaisar plough. | Breaking land and inverting the soil. | Cheapness, lightness (being only 16 seers in weight). The share can be removed at any time and fitted at will. The iron parts are made of ordinary sheet iron so that repairs can be easily done by ordinary village blacksmith. | Rs. 5 ... | Government Experimental Farm, Cawnpore. |
| 2 | Watt's chain plough. | Ploughing heavy lands and inverting the soil. | Easy draught and adaptable to the various modes of preparing the ground. | Rs. 7 ... (besides cost of chain.) | Ditto ... |
| 3 | Watt's beam plough. | Inversion of soil and ploughing heavy lands. | Easy draught and adaptability to the various modes of preparing the ground. No chain is used for working this plough. | Rs. 8 ... | Ditto ... |
| 4 | Baldeo plough. | Ploughing light soils. | Inversion of soil, simplicity of construction, cheapness and efficiency of work. | Rs. 2-8-0... | Ditto ... |
| 5 | The improved Baldeo plough. | Breaking and inverting light soils. | Stronger and more durable than the old Baldeo plough. | Rs. 3-8-0... | Ditto ... |
| 6 | The Meston plough. | Breaking and inverting soil. | Strong, durable, light, cheap, suitable for all kinds of soils. Easy of repairs and simple in construction. | Rs. 4 ... | Ditto ... |

DIX B.

*Experimental Farm, Cawnpore, during the year ending 30th September 1901, and of met with more or less marked success.*

| 7 | 8 | 9 | 10 |
|---|---|---|---|
| Name and designation of official reporter. | Opinion. | Extent to which used by native agriculturists. | Remarks by official reporter. |
| Mr. S. M. Hadi, M.R.A.C., Assistant Director of Land Records and Agriculture, North-Western Provinces and Oudh. | A good strong soil-inverting plough. It can plough an acre of land in 16 hours, the furrows being 4 to 4½ inches deep and 5 inches wide. | The plough is used by some well-to-do agriculturists in different parts of these Provinces, but is being gradually superseded by the more efficient Watt's plough. | Nineteen ploughs were sold during the year. |
| Ditto ... | More effective; stronger and more durable than the Kaisar plough. This implement is in common use at the Government Experimental Farm, Cawnpore, and maintains the reputation it acquired in previous years. It goes from 5 to 6 inches deep in the ground, making a furrow about 9 to 10 inches wide. It ploughs an acre of *dumat* land in a day. | Is specially appreciated and used by several well-to-do cultivators throughout the Provinces. Is also often indented for from other provinces. | Thirty-four were sold, one given on trial and five on hire. |
| Ditto ... | Just as No. 2, but used to a smaller extent than No. 2. | Some have been indented for from other provinces, and used chiefly by cultivators in the neighbourhood of Bulandshahr. | Seven were sold during the year under report. |
| Ditto ... | Is suitable for districts in which cattle are small and weak. It ploughs an acre of *dumat* land about 3½ inches deep in a day. | Is used by native cultivators in some places, notably Hardoi and Farrukhabad. | Twelve were sold during the year under report. |
| Ditto ... | It is larger and stronger as compared with No. 4; ploughs the soil more efficiently than the old Baldeo plough. An acre of *dumat* land can be ploughed in 16 hours, the width of the furrow being 6½ inches and the depth 4 inches. | Is used and much appreciated by native cultivators. Has been indented for from various parts of India. | Twelve were sold and five given on trial during the year under report. |
| Ditto ... | This implement has all the good qualities ordinarily desirable in a plough. Its weight is only about 26lbs, and though it is suitable for light soils, it works satisfactorily on clayey soils also. Even the inferior class of bullocks can work it easily. The ploughman has to undergo little exertion in working it. The mould board being made of wrought iron is | Has attracted much attention from the common cultivators and Special Managers, Court of Wards Estates: much appreciated by some agriculturists, who have given favourable opinion regarding it after actual trial. | Sixty-four were sold, four given on trial, and one hired during the year under report. |

APPEN

*List of Agricultural Implements and Machines which have been tested at the Government those in use which are reported to have*

| 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|
| Number. | Designation of implement. | Special use. | Special advantages or instructions. | Price. | Where procurable. |
| 7 | Jones' improved iron plough. | Ploughing and breaking of soil. | Easy draught and simple construction. | Rs. 6 ... | Engineering Cycle Company, Cawnpore. |
| 8 | The Madras harrow. | Harrowing ploughed land and cleaning it of dry weeds and grass. | Strong, durable, simple, cheap, and efficient. | Rs. 15 ... | Government Experimental Farm, Cawnpore. |
| 9 | The Planet J. R. horse hoe. | Hoeing and cultivating land. | Light, strong and cheap ... | About Rs. 35. | Messrs. Lloyd, Lawrence & Co., London, and their Agents T. E. Thomson and Co., Calcutta. |
| 10 | Baldeo balti or water lift. | Raising water from tank or canal. | The lift is made up of two galvanised iron troughs, each having a valve at the bottom, opening upwards. They are hinged on a wooden beam fixed to the ground at the discharging level, and are raised and let down alternately by a very ingenious arrangement of pulley's and ropes. The lift requires only one bullock and one man to work it. The bullock has to go round and round and not to reverse its motion. | Rs. 57 ... | Government Experimental Farm, Cawnpore. |
| 11 | Baldeo well water-lift. | Lifting water from wells by bullock-power. | This consists of a self-emptying iron bucket, having a valve at the bottom and a capacity of about 22 gallons, | Rs. 70 ... | Ditto ... |

DIX B.

*Experimental Farm, Cawnpore, during the year ending 30th September 1901, and of met with more or less marked success*—(continued).

| 7 | 8 | 9 | 10 |
|---|---|---|---|
| Name and designation of official reporter. | Opinion. | Extent to which used by native agriculturists. | Remarks by official reporter. |
| | particularly strong; and the standard and the share which are made of the cast iron are much more substantial than those of the "Improved Baldeo plough". For the price it is the best soil-inverting plough among those so far invented at the Cawnpore Farm. | | |
| Mr. S. M. Hadi, M.R.A.C., Assistant Director of Land Records and Agriculture, North-Western Provinces and Oudh. | This plough has been in existence for years, but it was sent to the farm by Mr. Jones for trial only in 1898. In construction it is similar to the Kaisar plough. All parts of it are made of wrought iron, except the beam, which is made of wood. Recently a useful improvement has been made by substituting an adjustable iron share for one which used to be rivetted to the sole and the standard. | Not known. | |
| Ditto ... | Its work is quite satisfactory ... | It has been in use at Saidapat Farm and has given satisfactory results at the Government Experimental Farm, Cawnpore. | Two sold during the year under report. |
| Ditto ... | Is a useful implement for hoeing and for pulverising the soil after it has been ploughed twice to the required depth by an improved plough. | Not used by natives. | |
| Ditto ... | The contrivance is a simple and ingenious one, specially adapted for irrigation from tank or canal where the depth of water does not exceed 6 feet. | Used in certain Court of Wards Estates and by a few well-to-do cultivators also. | |
| Ditto ... | The invention appears to be useful even in its present form, but the inventor is trying to make improvements in the machine. No | Not yet introduced among native agriculturists. | |

APPEN

*List of Agricultural Implements and Machines which have been tested at the Government*
*those in use which are reported to have*

| 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|
| Number. | Designation of implement. | Special use. | Special advantages or instructions. | Price. | Where procurable. |
| | | | fastened to a rope passing over a pulley and coiled round a wooden drum, which can move freely round a spindle fitted to the top of a wooden shaft sunk in the ground within a short distance of the well. One end of the cattle pole rests on the shaft and can move round the spindle, and to the other end a single bullock is yoked to draw the bucket. The drum can be engaged or disengaged with the yoke by means of a lever, the bullock not having to change its course of motion. The bucket is drawn as the bullock moves, but is let down by simple disengagement of the drum. | | |
| 12 | Cawnpore chain pump. | Lifting water from depths ranging from 5 to 35 feet. | Very efficient and useful ... | Rs. 40 to Rs. 60 according to the length of pipe. | Government Experimental Farm, Cawnpore. |
| 13 | Improved Cawnpore double pump. | Raising water from canal or tank by cattle power. | Two Cawnpore five or six feet chain pumps of 4½ inches diameter are worked by cattle-power. It lifts 50 cubic feet of water per minute from a depth of 4½ feet. It is very useful for irrigating large areas from tank or canal. | Rs. 250 ... | Ditto ... |
| 14 | Partábgarh boka or dugla (swing basket). | Raising water from tank or canal. | This method of lifting water is too well known to need description. The principle of the two swing baskets is the same. The chief difference lies in the shape of the baskets. The Partábgarh dugla from its shape appeared as if it would enter and leave the water with least resistance and therefore work more easily, but practically it does not work out so. The quality of the Partábgarh dulga is rather better, costing four annas, and is generally coated inside with some mixture containing resin in order to make it more waterproof. | Annas 4 ... | Partábgarh, Sultánpur and Fyzabad. |
| 15 | Cawnpore beri or dugla. | Ditto ... | The Cawnpore beri costs three annas and is not generally so coated. Both kinds are made in several sizes according to the strength of the workers and height to which the water has to be raised. | Annas 3 ... | Cawnpore, Fatehpur and other neighbouring districts. |

DIX B.

*Experimental Farm, Cawnpore, during the year ending 30th September 1901, and of met with more or less marked success*—(continued).

| 7 | 8 | 9 | 10 |
|---|---|---|---|
| Name and designation of official reporter. | Opinion. | Extent to which used by native agriculturists. | Remarks by official reporter. |
| | definite opinion about its utility can, therefore, be given at present. | | |
| Mr. S. M. Hadi, M. R. A. C., Assistant Director of Land Records and Agriculture, North-Western Provinces and Oudh. | For raising water economically with hand-power from depths not exceeding 20 feet. It is an excellent lift. | Is used by many well-to-do cultivators in these Provinces. | Thirty-two were sold, and five given on hire during the year under report. |
| Ditto ... | Is very useful and efficient for raising water from depths not exceeding five or six feet. | The implement, being very costly, is used by well-to-do cultivators only. | |
| Mr. J. M. Hayman, Deputy Director, Department of Land Records and Agriculture, North-Western Provinces and Oudh. | There appeared from the trials to be no practical advantage of one form of swing basket over the other in the matter of raising water, but the art of using the Cawnpore beri appeared to be very easily acquired, whereas the Partábgarh dugla requires some practice. | Extensively used by native cultivators. | |
| Ditto ... | | | |

APPEN

*List of Agricultural Implements and Machines which have been tested at the Government those in use which are reported to have*

| 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|
| Number. | Designation of implement. | Special use. | Special advantages or instructions. | Price. | Where procurable. |
| 16 | Maize sheller. | Separates maize grain from cobs. | It is found necessary in practice to pass the smaller cobs twice through the machine; and also to have manual labour to pick out with fingers the few grains that are left behind at the tops of the cobs. | Rs. 45 ... | From America. Not known definitely. |
| 17 | R. Hunt's kibbling machine. | For kibbling all sorts of grain. | Light, simple, durable, efficient and labour-saving. | Rs. 35 ... | Messrs. R. Hunt & Co., Earlscoline, England. |
| 18 | Nahan kibbling machine. | For crushing all sorts of grain | These kibblers are mere imitations of the R. Hunt's kibbler, and are of three different sizes. | Rs. 10 to Rs. 25. | Sirmore Factory, Nahan, near Umballa, and Government Experimental Farm, Cawnpore. |
| 19 | R. Hunt's chaff-cutter "The Simplex." | For cutting fodder. | Economy of labour, efficiency, durability, rapidity of work, simplicity and lightness. | Rs. 35 ... | Messrs. R. Hunt & Co., England, and Government Experimental Farm, Cawnpore. |
| 20 | Hand sieve | Separates large and plump wheat seed from inferior and small grains. | Consists of sieve with a wooden rim 2½ feet on all four sides and four rings at the four corners. The sieve is hung with four ropes from a roof or a tree, wheat poured in it, and worked forward and backward by a boy. The small grains fall down, the large ones stay behind. | Rs. 2-4-0... | Government Experimental Farm, Cawnpore. |

DIX B.

*Experimental Farm, Cawnpore, during the year ending 30th September* 1901, *and of met with more or less marked success*—(continued).

| 7 | 8 | 9 | 10 |
|---|---|---|---|
| Name and designation of official reporter. | Opinion. | Extent to which used by native agriculturists. | Remarks by official reporter. |
| Mr. P. V. Subbiah, Principal, Agricultural School, and Superintendent, Government Experimental Farm, Cawnpore. | A simple and efficient implement for use in places where maize is a common crop; can shell about 1,100lbs. to 2,000lbs. of grain in a day with four men and three women. The grain is not injured in separation and perfectly good for sowing. The cost of shelling a maund of grain with the machine is less than half of that when the grain is separated in the ordinary country way by manual labour, using fingers and sticks. Another advantage is that cobs that are not dry enough and cannot be dried on account of the rainy weather in September, cannot be shelled with hand, but can be with the machine so as to admit of taking the grain to the market early. | ... | |
| Mr. S. M. Hadi, M. R. A. C., Assistant Director of Land Records and Agriculture. | ... | ... | Sixteen were sold and one given on trial during the year under report. |
| Ditto ... | ... | ... | Three were sold during the year under report. |
| Ditto ... | ... | .... | Thirty-three were sold during the year under report. |
| Mr. P. V. Subbiah, Principal, Agricultural School, and Superintendent, Government Experimental Farm, Cawnpore. | A simple and efficient contrivance for getting rid of inferior and small grains and securing large plump wheat seed for sowing. Two men working at the sieve can clean about 15 to 20 maunds in a day. | Introduced only last year | Four were sold during the year under report. |

# ORDERS OF GOVERNMENT.

No. $\frac{575}{\text{I—316F}}$ OF 1902.

## RESOLUTION.

REVENUE DEPARTMENT.

*Dated Allahabad, the 24th February* 1902.

READ—

Letter No. $\frac{705}{\text{VIII—439}}$, dated $\frac{10\text{th}}{27\text{th}}$ January 1902, from the Director of Land Records and Agriculture, being his report on the operations of the Department of Land Records and Agriculture, North-Western Provinces and Oudh, for the year ending 30th September 1901.

OBSERVATIONS.—The report, which reached the Government with commendable punctuality, is the last which will be submitted in its present form. Proposals for its modification have been recently submitted to the Government of India. It contains a concise record of the year's operations, and shows substantial progress in the Department. Much useful work has been done in the various branches, especially in connection with wheat-breeding, the analysis of the brackish well water in the Muttra district, the distribution of seed, the preparation of an improved sugar factory, the issue of popular bulletins, and the encouragement of the Rohilkhand export trade in hemp fibre. The establishment of village banks has now been added to the long list of subjects dealt with by the Director, who has been appointed adviser on this important subject.

2. Mr. W. H. Moreland, who was in charge as Director for most of the year, controlled the Department with his usual zeal and ability, and the Lieutenant-Governor notices with satisfaction the commendation bestowed by him upon his staff. By the retirement of Mr. G. B. Scott in July last, the Government lost the services of an able officer, who had filled with conspicuous success the post of Superintendent of Surveys in these Provinces for seven years.

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ORDER.—Ordered that a copy of the above Resolution be forwarded to the Director of Land Records and Agriculture, North-Western Provinces and Oudh, for information.

W. H. L. IMPEY,

*Chief Secy. to Govt., N.-W. P. and Oudh.*

# REPORT

ON THE

# Operations of the Dept. of Land Records & Agriculture,

## UNITED PROVINCES OF AGRA AND OUDH.

*FOR THE YEAR ENDING 30TH SEPTEMBER 1902.*

*ALLAHABAD:*

Printed at the United Provinces of Agra and Oudh Government Press.

1902.

[Prescribed maximum limit of the report 25 pages, excluding tabular statements.]

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## *ERRATA.*

*List of corrections to the Annual Report of Director of Land Records and Agriculture for the year ending 30th September 1902.*

| Page. | Column. | Particulars. | *For* | *Read* |
|---|---|---|---|---|
| 20 | 1 | ... | Farrukhabad | Farukhabad |
| „ | 12 | Against Naini Tal (Tarai parganas only). | 52,630 | 52,636 |
| „ | | At the foot of the page. | In the eleven district &c. | In the eleven districts |
| 21 | 18 | Against Jaunpur ... | 28,410 | 28,415 |
| „ | 23 | Against Basti ... | 3,404,4-3 | 3,404,443 |
| 21 | | At foot of the page third line. | In po gress | In progress |
| „ | | At foot of the page fourth line. | returs | returns |
| 22 | 1 | ... | Farrukhabad | Farukhabad |
| 23 | 11 | Against Banda ... | 196,79 | 196,795 |
| „ | 16 | ... | tner | rent |
| „ | 14 | Against Meerut ... | 2,678,539 | 2,678,536 |
| „ | 15 | Against Farukhabad. | 525,979 | 525,779 |
| 24 | 21 | Heading ... | Siwai | Sewai |
| „ | 27 | Against Meerut ... | 8,096,701 | 8,096,771 |
| „ | 1 | ... | Farrukhabad | Farukhabad. |
| 26 | | At foot of the page fourth line. | Figures for a portion. | Figures for only a portion. |
| 27 | 22 | Against Rae Bareli, | 3,576,395 | 3,376,395 |

# REPORT

ON THE

# Operations of the Department of Land Records and Agriculture,

## UNITED PROVINCES OF AGRA & OUDH,

***FOR THE YEAR ENDING THE 30TH SEPTEMBER 1902.***

No. $\frac{608}{\text{VIII—486}}$.

FROM

W. H. MORELAND, ESQ.,

DIRECTOR, DEPARTMENT OF LAND RECORDS AND AGRICULTURE,

UNITED PROVINCES OF AGRA AND OUDH,

To

THE CHIEF SECRETARY TO GOVERNMENT,

UNITED PROVINCES OF AGRA AND OUDH,

REVENUE DEPARTMENT.

*Dated Lucknow, the* $\frac{\textit{10th December } 1902}{\textit{15th January } 1903}$.

SIR,

I HAVE the honour to submit the annual report on the work of this Department for the year ending the 30th September 1902.

Scope of the report.

2. The scope of this report has been changed with the approval of the Government of India. The second chapter deals with Land Records and Surveys, subjects which were hitherto noticed in detail in the Revenue Administration Report; the rest of the report deals with the agricultural work of the Department, excluding from the latter head two branches, agricultural research and the record of the agricultural conditions of the year, which are dealt with in separate reports.

## CHAPTER I.

### PREFATORY.

Charge of the Department.

3. I was in charge of the Department throughout the year. The post of Deputy Director was held by Mr. J. M. Hayman, that of the Assistant Director by Saiyid Muhammad Hadi, M.R.A.C., M.R.A.S., and that of Superintendent, Provincial Surveys, by Captain W. M. Coldstream, R. E. Mr. F. B. Sherring, Assistant Collector, was attached to this Department from 28th November 1901 to 19th March 1902 for the inspection of land records work. Bábu Dhanpat Lal, Tahsildár, was for two months on special duty in the Department assisting me in the revision of the Land Records Manual.

Tours of officers.

4. Under arrangements made with the Government of India I remained at Cawnpore during most of the cold weather organizing experiments in wheat breeding on the lines suggested by my experience in Australia, and training workers on the same lines for other provinces. During this period I visited the Normal School at Moradabad and the usar stations in Unao and Aligarh: inspected land records work in Fatehpur attended before the Commission on Industrial Training at Allahabad; and accompanied Mr. Hobart-Hampden, Deputy Conservator of Forests, to the Fisher Forest at Etáwah and other places in connection with his enquiries into the production of *babul* for the Cawnpore leather industry.

In July and August I inspected land records work in Moradabad, Mirzapur, Benares, Allahabad, Bareilly, Aligarh, Meerut, Muzaffarnagar, Saháranpur, Pilibhít, Kheri and Sitapur. Examinations of candidates for the post of partition amín were also held in Lucknow and Aligarh.

5. During the cold weather Mr. Sherring first accompanied me at my inspection of Fatehpur, and then inspected the Benares Division and the districts of Gorakhpur, Basti and Agra. I may take this opportunity of acknowledging the judgment and thoroughness with which Mr. Sherring performed his novel duties.

6. The Deputy Director spent two months of the cold weather in studying the agricultural condition of the Allahabad Division, devoting special attention to the cattle of Bundelkhand. The rest of the year was devoted to supervising the experimental work at Cawnpore and at the sub-station at Orai. In addition to the regular work of the department, Mr. Hayman supervised a lengthy series of experiments in rinderpest inoculation carried out during February and March under the directions of the Imperial Bacteriologist.

7. The Assistant Director spent October 1901 in distributing seed in South Oudh. During most of the cold weather he was in charge of the travelling sugar factory and gave demonstrations in the principal sugar-centres of Rohilkhand. He attended the Sultánpur Agricultural Show in February and the Nauchandi Fair in March. The months of April, May and June were devoted to the work of the seed depôt: the last quarter of the year was spent mainly at Cawnpore, but Lucknow and Aligarh were visited for the amins' examination. In addition to the work described above, the Assistant Director made such inspections as were required of the various institutions in his charge, the Meerut Farm, the usar stations, and the Agricultural Class at the Moradabad Normal School.

8. During the field season from 19th October to 4th May the Superintendent of Surveys conducted a survey training class of nine junior Civilians, inspected field work in Mainpuri and Etah, and the town surveys of Fyzabad, Ajodhya, Cawnpore and Allahabad; he also examined the existing village maps in Bánda, and certain disputed forest boundaries in Pilibhít; and inspected the survey parties and detachments in Azamgarh, Mainpuri, Etah, Jalesar, Jalaun and Kálpi. During the rainy season he visited the survey offices in Azamgarh, Mainpuri, Etah, Jalesar, Jalaun and Kálpi and the town surveys in Allahabad, Fyzabad and Ajodhya and met me at Moradabad to settle the survey programme for that district.

Special features of the year's work.

9. On the land records and statistical sides of the Department the chief feature of the year has been the large amount of office work which had to be done, and which has taken all the energies of my staff: fortunately much of what has been accomplished is of permanent value and will reduce clerical work in the future. The early part of the year was occupied in examining the lists of reports and returns in consultation with the officer on special duty in that department.

In December a summary account of the industries of the province was prepared for the Commission on Industrial Training, while from November to April I was engaged in compiling a new Land Records Manual for both provinces. During May and June I revised the rules for revision of Maps and Records in the Province of Agra, and prepared—(1) the quinquennial return of average crop yields, (2) the decennial memorandum on the material condition of the people and (3) the revised chapters of the General Administration Report dealing with the chief staples of the provinces. In revising the Survey Rules I received much assistance from the Superintendent of Provincial Surveys, while the memorandum on the condition of the people owes much to the co-operation of Mr. R. Burn, the Provincial Census Superintendent. The close of

the year was occupied in preparing two notes required by the Board of Revenue for the Irrigation Commission, and in finally compiling the estimates of food production and consumption, the preparation of which has occupied much of my time during the past two years.

10. On the agricultural side of the Department the chief feature of the year has been the steady extension of the operations of the seed depôt: in fact the demand for sound seed on the part of the cultivators in South Oudh bids fair to become embarrassing to my small agricultural staff.

11. The acquisition of land for the Cawnpore Experiment Station is also deserving of notice in this place. The experimental farm and the grounds of the school have been purchased, and sufficient additional land has been taken to afford a site for an Agricultural College and for a demonstration farm which would be needed in connection with it.

## CHAPTER II.

### (1) Land Records.

Establishment.

12. The strength of the staff of Supervisor Kanúngos in the provinces was reviewed during the year, and a net increase of five men was proposed and sanctioned for Oudh. Proposals for revision in the province of Agra are still under consideration, but there is no doubt that an increase will be necessary as some districts are understaffed, and the new system of settlement in Bundelkhand will involve some additional supervision. In the patwári school establishment a teacher was sanctioned for Etáwah and assistant teachers for Sháhjahánpur and Gonda, while some servants were also appointed. The number of patwáris in Agra remained practically unchanged, but the introduction of the revised allocation in Oudh (referred to in the next paragraph), has resulted in a net decrease of 116 men during the year.

Revision of circles.

13. In the province of Agra proposals for changes in the staff of Meerut district have been received and are under examination, and a scheme for Bareilly is being prepared by the District Officer. In Oudh the schemes for Kheri, Bahraich, Partábgarh and Sultánpur were sanctioned and introduced during the year. Proposals for two tahsíls of Gonda have been submitted for sanction; the scheme for the third tahsíl, which will complete the revision in Oudh, is awaited. The net additional cost of the revision for the whole province will be slightly under the estimate of Rs. 50,000.

Promotion of kanúngos.

14. The flow of promotion continues to be very slow. Not a single supervisor was promoted permanently during the year, and only eight men received temporary appointments as Naib Tahsíldárs. More than this is required as an incentive to the staff and it appears to me that the time has now come when a larger number of nominations for Naib Tahsíldárships should be thrown open to the Department. The class of men who are passing through the Agricultural School is greatly superior to what was obtained by the old method of recruitment, but the maintenance of the present high standard can be secured only by the offer of adequate prospects of promotion. Three good conduct allowances were awarded to sadr kanúngos during the year; none of these officials received any other form of promotion.

Promotion of patwáris.

15. Nine patwáris were permanently promoted to higher posts in the district establishment, while others received temporary promotion. Four patwáris were exempted from the educational test under the authority delegated to me by Government.

Education of patwáris.

16. The percentage of patwáris who hold the school certificate has risen from 88·9 to 89·9 during the year, and the percentage of exempted patwáris has fallen from 7·6 to 6·8. As the great majority of the exemptions were given originally on account of age and efficiency, the number can only be reduced gradually as the exempted men die or retire. The balance of 3·3 per cent. consists almost entirely of posts temporarily vacant and of heirs appointed conditionally under Rule 2 of Circular I—VII. The only district where unpassed men, other than heirs, are numerous is Sháhjahánpur where the long-continued record and settlement operations have interfered with the working of the school. There are also a few unpassed men in Allahabad and Mirzapur: it is difficult to get qualified men to serve in the country south of the Jumna. The number of exemptions shows a rise in six districts: in five the increase is due to correction of misclassification in previous returns, while in the remaining district (Basti) an explanation has been asked for.

17. The patwári school rules were revised during the year in consultation with Commissioners and were reissued as Circular 2—VII. The changes were directed mainly towards improving the course of teaching, especially in map-maintenance to which insufficient attention had been devoted in many cases. The grant of good conduct allowances has been sanctioned in order to make it possible to retain efficient teachers: hitherto the post has been regarded as a stepping-stone to a kanúngoship and the efficiency of the schools has suffered from frequent changes in the staff.

Residence of patwáris.

18. In the province of Agra 79 per cent. of the patwáris are returned as living in their circles, 11 per cent. are exempted and 10 per cent. are absentees without permission. Much attention has been given to this important subject in many districts, with the result that increased numbers of absentees have been detected, and on the whole the progress made during the year has been satisfactory; but the maintenance of the advance must depend on the continued exertions of the district staff. In Oudh the recent reallocation of circles has increased temporarily the number of non-residents, but a large number of patwáris have already gone to their new circles in Rae Bareli, Hardoi and Bara Banki; much progress is looked for in other districts during the current year.

19. Loans aggregating Rs. 400 have been sanctioned in Basti to enable patwáris to meet the cost of building houses in their circles, and enquiries are being made as to the desirability of extending this system in other districts where the number of absentees is large.

Filing of patwáris' papers.

20. The dates for filing most of the important papers were altered with effect from the beginning of the current year, and the returns received are vitiated by the fact that some districts have calculated them on the old dates and others on the new; it would be misleading therefore to compare the figures with those of previous years, but an examination of the returns shows that where normal conditions prevailed the papers were, as a rule, filed with creditable punctuality. The greatest delay occurred in Jhánsi, Allahabad, Benares and Kheri. In Jhánsi the delay occurred in Lalitpur, where there were heavy arrears of map-correction to make up; in Allahabad the outbreak of plague threw the work out; in Benares and Kheri the delay indicates defective administration. In the last named district I gave instructions at my August inspection which will, I hope, result in improvement. Of the three Rohilkhand districts which were noticed unfavourably in the last two years, there is a distinct improvement in Moradabad and a slight improvement in Budaun. In Bijnor the settlement operations in part of the district may account for the apparent deterioration, but the land records in this district are not satisfactory.

Testing of patwáris' papers by supervisors.

21. The returns show that an adequate amount of testing has been done, except in a few districts. As to the truth of the returns it is difficult to speak with certainty : fictitious entries were detected in the papers of four kanúngos in Budaun, and no doubt there are other kanúngos who show on paper work that has never been done. The value of the supervisor's test will, however, be more appropriately discussed in another paragraph. According to the supervisors' tests the percentage of accuracy in the khasras is three, in the khataunis one and in the jamabandis two, but there is no reasonable doubt that the true percentage is higher at least in the case of the last two records.

Testing by superior officers.

22. It is useless to compare the figures for the year under report with those of the previous year when so much time had to be devoted to work connected with the census. A substantial amount of testing has been done by officers of the headquarters staff in most districts, Fatehpur, Bánda and Sultánpur being the best. The amount done was utterly insufficient in Bulandshahr, Hamírpur, Gházipur, Hardoi and Kheri, while the work in Muzaffarnagar, Muttra, Bijnor, Mirzapur, Bahraich and Bara Banki was also inadequate. Tahsíldárs, who with the assistance of their naibs are required to test the work of every circle once in three years, have, as a rule, complied with these orders: pressure of other work interfered with the routine in Fyzabad, Bareilly and Allahabad, and there were also shortcomings, not satisfactorily explained, in Saháranpur, Meerut and Hamírpur. The test has not, however, been in all cases as thorough as it should, especially in Bulandshahr, Hardoi, Muzaffarnagar, Bijnor, Mirzapur, Bahraich, Bara Banki, Benares and Unao. It is perhaps a coincidence that this list is almost identical with the list of districts where the headquarters staff did very little, but it is most unfortunate that the records should have been neglected by all officers alike.

23. As regards the accuracy of the work as disclosed by the testing done by superior officers, it may be noted that less than 1 per cent. of error was found in khasra entries that had already been tested by supervisors, while practically 4 per cent. of error was found in untested entries : the percentage in the rent-rolls was two and in the khewats one. The supervisors' work was found to be noticeably defective in Meerut, Farrukhabad, Bánda, Hamírpur, Mirzapur, Lucknow and Unao, in most of which districts the work is known to be bad : but it would not be safe to draw a corresponding inference regarding districts where few errors were detected as the test is not always so thorough as it should be.

24. The sadr kanúngos have, as a rule, done a sufficient amount of work : any defects that have been noticed in their returns have been pointed out to them at the time. The sadr kanúngo of Unao was removed during the year at my instance, and the cases of two other sadr kanúngos have been referred to the Commissioner. On the other hand I am glad to notice that District Officers commend the work of the sadr kanúngos in Muttra, Allahabad, Ballia, Gorakhpur, Basti and Bara Banki.

25. It has been decided during the year under report that districts where the record work is inferior shall be taken up in order, a junior Assistant Collector being posted to each for the cold weather to overhaul the system thoroughly. I anticipate very great benefits from this decision : officers have been posted to Meerut, Mirzapur and Unao during the current season.

Maintenance of boundary marks.

26. The prescribed procedure for inspection of boundary marks was followed in all districts except where the patwáris were engaged in survey or settlement work. Necessary action has been taken for repair or renewal, in the latter case by the erection of stone pillars. In Moradabad where the marks had been neglected for

years the Collector is arranging for their renewal during the current season.

Map correction.

27. In the province of Agra the great majority of the maps can be maintained without much difficulty, and they are so maintained where the supervisors see that it is done. Difficulties occur, however, in those parts of Bundelkhand where the cultivation fluctuates and in certain alluvial tracts. In the former region the new maps of Lalitpur fell behind during the famine, but nearly all have now been brought up to date: Jalaun is under survey, while revision of the maps in Bánda and Hamírpur will shortly be undertaken under professional supervision. It has been decided that the tracts of fluctuating cultivation in the south of Allahabad are not worth resurvey and the patwáris are now undergoing a course of training intended to enable them to estimate the cultivated area year by year with some approach to accuracy. The question of map maintenance in the alluvial tracts of Ballia is now under consideration: in other districts the ordinary rules are apparently sufficient if properly applied.

28. In Oudh where the obligation to correct maps is of more recent introduction the progress made has been on the whole satisfactory, and according to the district reports the maps in Fyzabad, Partábgarh and Rae Bareli are fairly up to date: in Lucknow, Unao and Sultánpur some maps have not been corrected, but arrangements have been made to complete them during the current year. In Bara Banki practically all have been corrected except those of pargana Bhitauli which are now under examination to see what can be done. In Bahraich and Kheri some arrears have occurred in the alluvial tracts, while in Hardoi work has been interfered with by settlement operations and the matter will have to be taken up as soon as these are concluded. The maps in Sítápur have again been examined and are now being classified under my instructions into those which the patwáris can correct and those where changes have been so numerous that maps corrected in the ordinary manner would be unintelligible. When the number in the second class has been ascertained proposals regarding them will be submitted. In Gonda the patwáris are only returning to district work. It is most important that in this district, and also in Kheri and Bahraich, the district staff should pay special attention to this matter in order that the new maps may not be allowed to fall behind.

Concealment of rents.

29. Cases of concealment of assets are reported from ten districts, but they disclose no novel features; the usual methods adopted are either simply to collect more than the recorded rent, to take fictitious bonds from incoming tenants, or to enter land as cultivated by persons under the landholder's influence, the real cultivators being shown as sub-tenants but paying rent direct to the landholder. It is satisfactory to note that in some districts the landholders responsible for fraudulent records have been made to feel their disgrace by the withdrawal of arms licenses and other suitable measures. Concealment of assets is also reported to prevail in Saháranpur, Basti and Moradabad, though no cases were detected during the year. Regarding Basti the Commissioner remarks that in rent appeals landholders not unfrequently admit that they collect higher rents than they return for entry in the village records. There is no doubt that the administration in this district has been defective and that the records generally are not as good as they should be, but the present Collector is taking active measures to raise the standard.

30. With regard to the provinces generally, there is no doubt that the rent-rolls have not in the past received the attention they deserve. I regard the change introduced last year under which the supervisors are made clearly responsible for the accuracy of the rent-rolls as the first step towards improvement: the next step must be to secure adequate supervision from the officers of the district staff.

Preparation and maintenance of tahsíl registers.

31. The new registers are now in use in all Oudh districts except Gonda where they are being prepared in the settlement office. In the province of Agra new registers for Benares and Mirzapur are being prepared by my staff, and arrangements have been made to take up Jaunpur, Gházípur and two tahsíls of Pilibhít during the current year. Work is also in progress in the settlement offices of Aligarh, Farrukhabad, Bijnor and Bareilly, tahsíl Bisalpur of Pilibhít being dealt with in the last named office.

32. The remaining pargana hand books of Kheri and Partábgarh were issued during the year : those of Sháhjahánpur are ready except for the maps.

33. As regards maintenance, the registers are, as a rule, up to date and twelve District Officers report that they are accurate : several reports however are silent on the point of accuracy. My own inspections continue to show that the check of these registers is not infrequently neglected by the subdivisional officers : such cases are brought to the notice of the Commissioner.

Use of the tahsíl registers.

34. The rules requiring subdivisional officers to examine the pargana book village by village before going on tour and to frame their programme so as to see those villages where the figures are abnormal have now been in existence for several years, and while many officers have carried them out conscientiously, it is disappointing to note that they have not yet been universally recognised. I have submitted to the Board of Revenue the names of those subdivisional officers who were found at my inspections to have neglected the rules, and I propose to continue this course in future. I consider that this preliminary examination of the figures is absolutely essential to secure that all abnormalities receive due and timely attention : the alternative preferred by some officers, to carry the pargana books in camp and look up the figures of those villages they happen to be near, gives no such security.

35. The reports on agricultural deterioration show that a substantial amount of information was accumulated and put on record during the year, though in some districts inspections were hindered by the preparation of the list of famine relief projects. The tendency among the senior officers of the provincial service is to be content with noting a paraphrase of the figures in the pargana book instead of finding out the explanation of the abnormality : for instance I often find a large decrease in occupancy-tenants' land attributed to the number of relinquishments ; the real question in this case, what caused the relinquishments, is entirely neglected. The rules enable District Officers to control their staff in this matter as the proposed notes have in most cases to be submitted to them for approval, and it is hoped that this control may be so exercised as to secure that only notes of value are placed on record.

Director's inspections.

36. As already explained in the first chapter of this report my touring work during the cold weather was made over to Mr. F. B. Sherring, Assistant Collector, who inspected eight districts. During the rains I was able to examine the headquarters work of seven districts and to look into the preparation of tahsíl registers in four others.

Amendment of rules.

37. The principal feature of the year under this head was the issue of new manuals of land record rules for both provinces. The need for a manual which should incorporate the large mass of circulars and circular letters issued during the last ten years had been felt for a considerable time, and the changes involved by the new Land Revenue and Tenancy Acts made immediate action necessary. The manual was drafted by me with the asisistance of Bábu Dhanpat Lal, Tahsíldár, who was placed on special duty for the purpose, and who gave me most valuable help.

The draft was then examined by a small committee consisting of Mr. R. W. Gillan, Mr. J. H. Cox, and myself. Apart from the simplification caused by the incorporation of circulars in the rules to which they referred, the objects kept in view during the revision were (1) to shorten procedure and discard all superfluous registers, and (2) to lay down distinctly the duties and responsibilities of every officer and every official connected with land records.

38. The rules for the revision of maps and records in the province of Agra were also revised and their issue has been sanctioned since the close of the year. The land record rules for the Bhábar are at last practically settled, but I have had to refer to the Commissioner regarding certain questions of drafting before submitting them to the Board for approval. A set of rules has been issued for the record of injury to crops by water-logging and deposit of sand (*balpanchit*) in the alluvial villages of the Dumraon estate, where the tenants have established their claim to reductions of rent on account of such calamities. Rules have also been framed for (1) the preparation, and (2) the maintenance of a record of *nautor* in those tracts where revision of assessment is needed at frequent intervals owing to the fluctuating nature of the cultivation, and the area of stable cultivation has to be ascertained.

State of the patwári funds.

39. The contribution from provincial funds amounted to Rs. 10,34,000, and the surplus for the year was Rs. 1,12,975. The position of the funds is now rapidly improving owing to the reduction in the number of survey parties at work, but on the other hand considerable expenditure has to be faced in the near future for maintaining the Bundelkhand maps and records with sufficient accuracy for summary revisions of assessment, and also for strengthening the supervising staff where it is at present inadequate.

## (II) Surveys and revision of records.

Programme of the year.

40. The programme for the year in each district was as follows :—

I.—*Azamgarh.*—The completion of maps and records in tahsíl Sagri, and the commencement on the two years' system of the survey and record writing in Muhammadabad.

II.—*Mainpuri.*—The completion of maps and records in Barnahal, Karhal, and Ghiror and the commencement of survey and record writing in Mustafabad and Shikohabad.

III.—*Jalaun.*—The completion of maps and records in Kálpi and Orai, and the commencement of survey and record writing in Jalaun and Kunch. The work in this district has been carried out by two complete parties in order to shorten the period of operations by a year.

IV.—*Etáwah.*—The completion under the district kanúngos of the survey and khasra writing in those villages of Bidhuna and Auraiya where operations had commenced before the removal of the survey party in October 1900.

V.—*Etah.*—The completion of maps and records in parganas Bilrám, Soron, Saháwar, Sirpura, Pachlána and Patiáli : the traverse and cadastral survey and record writing on the one year's system of the riverain parganas Aulai, Faizpur-Badaria and Nidhpur ; and the correction of existing maps and records in tahsíl Jalesar.

Area surveyed, records written and cost.

41. In Azamgarh the above programme has been fully carried out ; in Mainpuri and Etah where the patwáris' circles are larger the records of a few of the larger villages are still in hand and will very shortly be completed ; in Jalaun the records of 58 villages remained in hand on 1st October ; there is, however, sufficient work in the completed villages to fully employ the attestation officers.

42. The total area cadastrally surveyed, including map correction in Jalesar, which amounts practically to a resurvey, is 2,507 square miles, and the total expenditure in the district survey parties is Rs. 1,78,562-1-10, the cost rate for the whole cadastral work being Rs. 71-2-0 per square mile. If the salary and allowances of the Superintendent and the cost of his office and other headquarter charges are included in the cost of the cadastral survey, the total expenditure is Rs. 2,21,900-8-9 and the cost rate Rs. 88-5-0 per square mile. The area surveyed for each district and the cost and rate per square mile are given below :—

| | Area surveyed in square miles. | Cost. | Cost rate per square mile. |
|---|---|---|---|
| | | Rs. a. p. | Rs. a. p. |
| Azamgarh ... | 427·12 | 29,542 0 0 | 69 2 0 |
| Mainpuri ... | 608·13 | 42,712 0 0 | 70 3 0 |
| Jalaun ... | 761·0 | 58,271 0 0 | 76 9 0 |
| Etáwah ... | 43·0 | 1,770 0 0 | 41 2 0 |
| Etah ... | 667·75 | 46,266 0 0 | 69 4 0 |

43. The total area for which records were written in the field is 2,823 square miles. The difference between this area and that surveyed is due to the survey work last year having been pushed ahead of the record writing in Etah.

44. As the programme of the traverse operations on a large scale was exhausted last year, the traverse party reverted to Imperial employment in October. A small detachment was retained to complete the riverain traverse in Etah and, on the completion of this work, has been retained for a further period, to undertake miscellaneous surveys at the cost of departments and municipalities concerned. The total area traversed was 181·16 square miles, and the total expenditure on the work was Rs. 3,879-3-11, the cost rate being Rs. 21-6-7 per square mile.

**Difficulties encountered.**

45. In Azamgarh the complexity and minute subdivision of the owners' shares, and the small size of the fields, made the work very laborious. In Mainpuri and Jalaun the non-attendance of patwáris, chiefly due to absence without leave, gave much trouble. In Jalaun the fluctuating nature of the cultivation rendered revision of the previous year's work necessary in many villages, where owing to delays in last year's work the final *partalling* had been postponed. There has also been in Jalaun considerable difficulty in obtaining labour from the landholders to assist the patwáris. The broken character of much of the country also increased the difficulties in Jalaun. In Etah the *sír* and *khudkásht* statements (prepared before the survey commenced and forming the basis of the survey records) proved unreliable and had to be revised. The services of all the patwáris were taken from the survey officer for this purpose in batches during the year. In Etáwah, where the work has continued for more than 2½ years under the district kanúngos, it was found necessary to make special arrangements to complete it, and a small supervising establishment was deputed for the purpose.

**Amount of work done by patwáris.**

46. The average daily outturn of survey varied from 11 acres in Jalaun to 13 acres per man in Azamgarh; in *khánapuri* it was 20 field numbers per man in Etah and Jalaun, 32 in Mainpuri, and 35 in Azamgarh. The size of the fields in Jalaun is larger than in the other three districts, and a considerably greater outturn might have been expected from the patwáris, who are less competent here than elsewhere. In Jalesar the average daily outturn of map correction per man was 27 acres.

47. The total number of patwáris in the tracts under survey was 1,187; of these 1,024 proved sufficiently competent, 94 were allowed to depute their heirs to do their work, and substitutes had to be provided for 69 only.

48. The employment of 44 amíns was rendered necessary by the difficult character of the ground in Jalaun and in parts of Azamgarh, and to complete the work in the riverain tracts in Etah, where both traverse and cadastral operations had to be completed within the year.

Amount of check.

49. The traverse work in Etah proved satisfactory, the comparison with values of the two Great Trigonometrical stations connected with the work disclosing an error of 1·12 feet per mile. Each cadastral sheet was passed by a European officer on the results of his own, or of independent, *partals*. The total number of linear miles of check survey run was 10,168·7 and the mean length per square mile for the whole work was 4·6 linear miles. In *khánapuri* 28 per cent. of the entries in the khasras were checked on the spot.

Accuracy of maps and records as reported by Settlement Officers.

50. The reports of Settlement Officers on the maps and records of last year's work are, as regards maps, entirely satisfactory; the records in Azamgarh were considered to be as accurately prepared as was possible under the circumstances and elsewhere it was considered that there was room for improvement. It is hoped that the changes introduced in the rules for the revision of surveys and records will lead to more accurate work.

Miscellaneous survey operations.

51. The following miscellaneous surveys have been completed as regards field work during the year. As there still remains work on the completion of maps (and in Ajodhya and Fyzabad records) the cost rates are not final, but the expenditure still to be incurred is very small:—

| Names of surveys. | Scale. | Area in square miles. | Cost rate per square mile. Rs. a. p. |
|---|---|---|---|
| Cawnpore Municipality ... | 64 inch ... | 8·37 | 553 0 0 |
| Fyzabad and Ajodhya nazúl survey and preparation of records of rights. | 64 inch and 16 inch. | 4·2 | 1,013 0 0 |
| Fyzabad cantonment ... | 12 inch 48 inch | 7·6 | 68 6 0 |
| Allahabad, extension of civil station. | 200 feet to 1 inch. | 2·13 | ... |

All the sheets of the above surveys have been passed by the Superintendent and in the case of Cawnpore by the Survey Officer of Jalaun after adequate *partal*. In addition to the above 594·5 linear miles of roads in Farrukhabad, Mainpuri and Jalaun have been surveyed at the cost of and for the Public Works Department, the cost rate being Rs. 6-10-3 per linear mile.

52. In the drawing office at Naini Tál ten standard sheets on the scale of one inch to a mile comprising areas in Meerut and Sháhjahánpur have been completed during the year and work has been in progress on 25 others.

Officers employed.

53. Mr. Kennedy held charge of the Naini Tál Drawing Office and Mr. F. S. Bell of the Traverse Section throughout the year, except during May, June and July, when Mr. Kennedy was obliged through ill-health to take leave, and Mr. Murphy officiated for him. The distribution of Survey Officers and Assistant Survey Officers has been as follows:—In Azamgarh, Mr. T. Freeman assisted by Mr. G. Rae; in Mainpuri, Mr. L. F. Berkeley assisted by Mr. J. Murphy; in Etah, Mr. F. S. Powell assisted by Mr. C. Johnson; in Jalaun and Kunch, Mr. P. C. Smart assisted by Mr. C. Littlewood; and in Kálpi and Orai, Mr. O. D. Smart up to July 1st when he reverted to the Survey of India. Mr. T. Freeman and Mr. L. F. Berkeley among the Survey Officers have again done specially good work and have been untiring in their efforts to maintain a thorough check over both maps and records. The promotion of Mr. Freeman to the Junior Secretaryship of the Board of Revenue deprives the provincial survey department of its most competent executive officer.

## (III) Classification of holdings and rental statistics.

Variations.

54. The return of holdings and rental statistics has hitherto been printed as Appendix IV of the Director's Report published in the Revenue Administration Report of the province. It used to appear a year behind the area and crop returns, but as under the new arrangement of land records work the interval hitherto provided for testing the figures has become unnecessary the returns for both the years 1308 and 1309 fasli (1900-1901, and 1901-1902) are appended for the province of Agra and Oudh separately.

55. The total holdings area of Oudh advanced by 167,503 acres in 1308 fasli and again by 138,555 acres in 1309 fasli. The increase occurred mainly in the area held without declared rights and is the result of an extension in cultivation following on the return of prosperity to the province. The variations for this province under other heads are unimportant and call for no special remarks. The total holdings area in the province of Agra also shows a satisfactory advance in both years; in 1308 fasli the increase over the preceding year's figures amounted to 295,134 acres and in 1309 fasli to 255,300 acres. The improvement was shared by all the divisions, but was greatest in Allahabad where cultivation is recovering. As in past years the area under *sír* continued to decline in most districts, but as the revision of records in Meerut has resulted in the record of *sír* rights in 248,725 acres hitherto classed as *khudkásht* or as held without declared rights, the total area under *sír* for 1308 fasli exhibits an increase of 214,635 acres; in 1309 fasli there was a drop of 14,454 acres. The total *khudkásht* area for 1308 fasli shows a decrease of 102,130 acres due to the transfer to *sír* in Meerut and an increase of 51,453 acres in 1309 fasli. The area held in 1308 fasli with ex-proprietary or privileged rights rose by 9,515 acres in Meerut owing to the revision of records, and by 12,909 acres in Hamírpur by transfer from *sír* and *khudkásht*. In the other districts also there was, as usual, some increase, which for the province amounts to 28,959 acres. The figures for 1309 fasli exhibit no important variations. The general decline in the occupancy area was maintained in both years; but as the new settlement record gave an increase of 63,730 acres in Meerut and of 23,618 in Bareilly, the total occupancy area of the province for 1308 fasli rose by 16,207 acres. In 1309 fasli there was a drop of 48,319 acres. The area of land held by tenants without declared rights declined by 119,432 acres in Meerut owing to the revision of records; elsewhere there were increases in consequence of an extension in cultivation, the increase being 133,602 acres in 1308 and 240,801 acres in 1309 fasli. Land held without rent increased by 3,861 acres in 1308 and by 26,001 acres in 1309 fasli; variations by districts are unimportant except in Bijnor which shows an increase of 13,273 and 10,856 acres respectively owing to a transfer to this head of the rent-free area which was hitherto attached to rented holdings and shown under them.

56. The rent-paying area of the United Provinces rose by 320,791 acres in 1308 fasli and by 317,738 acres in the following year. In both the years the increase was greatest in the Allahabad Division. The total rental demand amounted respectively to 1,294 and 1,306 lakhs of rupees; and the total recorded collections to 1,214 and 1,181 lakhs of rupees. The percentage of total recorded collections on total demand for both the provinces taken together was 94 in 1308 fasli and 90 in 1309 fasli. The chief reason of the lower percentage in the latter year is that most of the abnormal arrears accumulated in bad seasons have already been paid up: arrear collections fell off by 25 lakhs of rupees. It must be repeated that these figures are at present valuable for comparative purposes only: the record of collections is still most defective in many districts.

## CHAPTER III.

### ARBORICULTURE.

Summary of work done.

57. Tree planting outside the forest areas is for the most part the function of the district boards, which submit annual returns of their work to my office. Their operations are ordinarily directed to extending roadside avenues, but in some of the hill districts the money available is spent in planting bare hill-sides and in some plains districts operations include the planting of camping grounds and other groves. The avenues on provincial roads are maintained and extended not by the district boards but by officers of the Public Works Department, who send me returns of the work done during the year. Each set of returns is reviewed as received, and any defects that appear are pointed out at the time; in this report therefore it is necessary only to give a brief summary of the year's results.

58. In past years the custom was to estimate the year's work by the length of avenue planted, and to pay little attention to the success attained. The result has been to accumulate a mass of untrustworthy statistics: thus according to the figures of past years there are 7,659 miles of avenues in the provinces, but during the year under report 527 miles of these have been struck off as having no trees. No doubt there are still paper avenues on the books, and the figures for total length of avenues and for new plantings may be passed over. The revised and simplified forms of returns show that 182 miles of avenue have been established during the year: the term "established" meaning that the trees planted in previous years have made sufficient progress to be left to themselves. Of this length 69 miles are on provincial and the remainder on district roads. As regards the planting undertaken during the year it is sufficient to note that as a rule more was not planted than can be properly looked after: in a few cases where temporary enthusiasm had led to the planting of a large number of trees it was necessary to have the working-plans revised to provide sufficient funds for their future maintenance.

59. Twenty-two full miles of avenue were planted by private persons on district roads, half of them in Sultánpur, while in the aggregate a large number of trees were planted on short lengths of avenue in Bara Banki.

Maintenance of working-plans.

60. Working-plans are in existence in all districts and were adhered to in the majority of cases. In some instances, however, experience has shown that some of the data adopted in the original plans were unsuitable, while in four districts the scheme of work was altered out of caprice, and in one it was found that the nurseries had been neglected and trees were not available. Where necessary, arrangements have been made to revise the plans so as to provide sufficient funds for the maintenance of the new work.

Financial results.

61. The expenditure on provincial roads was Rs. 26,121 and the revenue Rs. 36,834 leaving a surplus of Rs. 10,713. The hill districts and Bundelkhand show deficits as in these tracts either the avenues are unproductive or there is no demand for the produce. Of the gross income over Rs. 20,000 was derived from sale of loppings and of annual produce (including roadside grass), close on Rs. 8,000 from sale of fallen trees, and Rs. 8,600 from sale of superfluous trees cut down.

62. Operations by district boards have involved a net outlay of only Rs. 4,305. Most of the boards in the Meerut and Rohilkhand Divisions have made a profit, as have those of Mainpuri, Etáwah, Fatehpur, Mirzapur, Gorakhpur, Basti, Lucknow and Bahraich. The largest deficits occur in the Bundelkhand districts and Agra where it is difficult to make

an income, and in Jaunpur, Rae Bareli and Sultánpur where the income is very low, and could apparently be improved by closer administration. It must be remembered, however, that the financial year 1901-1902 included a very bad fruit season, and the income from the mango avenues was generally very poor. The gross income received by the boards was Rs. 63,027 : of this sum over Rs. 35,637 was derived from sale of loppings and annual produce, Rs. 12,400 from sale of fallen trees, and Rs. 15,000 from sale of superfluous trees cut down. The main source of annual income is the roadside grass (Rs. 26,800), and it is on its profitable disposal that financial success depends. Due attention has been given to this matter in most districts, but the following instances appear to indicate that more might have been realized: Sháhjahánpur received Rs. 624, while Pilibhít obtained Rs. 1,637 : Cawnpore obtained Rs. 28, while Fatehpur realized Rs. 1,562 : Fyzabad realized Rs. 9, while Bara Banki obtained Rs. 348.

## CHAPTER IV.

### Assistance given to the public.

Distribution of implements.

63. The implement store remained open during the year and supplied on payment implements of various types which cannot readily be procured elsewhere in the provinces. The majority of the implements stocked, chaff-cutters, kibblers, pumps and the like, are suitable for landholders and the more substantial cultivators, their price putting them beyond the means of the ordinary tenant; the demand for these fluctuates from year to year and is never large, but the store meets a distinct though limited want. Last year the demand for all classes of these implements fell off. The demand for improved ploughs also shows a decrease, 96 having been issued against 166 in the previous year; the decrease is attributed by the Assistant Director, who is in charge of the store, to his inability to arrange for a sufficient number of demonstrations. It cannot, however, be expected that these ploughs will ever replace the native implement which serves both for plough and cultivator. The tenant who owns several ploughs will find that the possession of one improved plough will lead to better tillage and economy of time, but the single-plough cultivator must stick to his present implement.

64. Arrangements have been made with the cordial assistance of officers in the Irrigation Department to show the cultivators in part of the Meerut Division the double-chain pump, geared for cattle draught, which has proved so economical at the Cawnpore Farm. If the price is not too high, this pump should be most useful in the canal sugar-tracts. The "Baldeo" water lift is adapted to serve the same purpose on a smaller scale : it is being subjected to a severe test on the Cawnpore Farm to ascertain any weak points in actual working ; if it stands this test it will be shown at work in the same way as the chain-pump.

Distribution of seed.

65. The work of the department falls into two divisions : cash sale of seeds at Cawnpore, the issues including such foreign staples as are asked for, as well as the best local varieties ; and issue of seeds on loan to cultivators from various depôts. From Cawnpore 36 kinds of seed were issued, about 336 maunds in all being disposed of. The varieties most in demand were Muzaffarnagar wheat, Cape oats, and Jaunpur maize. The demand for Canadian oats, acclimatised cotton, *inga-dulcis*, peas and rape was in excess of the available supply.

66. Seed depôts were at work during the year in Partábgarh, Aligarh, Meerut, Mohanlalganj, Beti, Sultánpur and Amethi. The first three are managed and financed directly by the department : those at Mohanlalganj and Beti are managed by the Court of Wards with departmental assistance : those at Sultánpur and Amethi are managed by the department but financed by the district board. In addition

to these centres, operations have started in Fyzabad, where the Deputy Commissioner has devoted some funds at credit of the agricultural show to the same purpose.

67. The scheme of operations at these various centres is uniform : clean, sound seed is issued to cultivators who return the produce at harvest time *plus* 25 *per cent.* The receipts are carefully cleaned and picked, all inferior seed being sold and the balance kept for issue in the next year. When operations started in Partábgarh I tried to work through the landholders, but their interest in the matter was short lived and direct dealing with the cultivators is proving far more satisfactory. The work done during the year may be summarised as follows. The issues from the depôts controlled by the Department were 756 maunds, of which 534 maunds were Muzaffarnagar wheat. The Mohanlalganj depôt issued 217 maunds, consisting of wheat and oats, and that at Beti 621 maunds, mostly wheat. The depôts at Sultánpur and Amethi issued 444 maunds of wheat and a small quantity of maize. The total issues thus amounted to over two thousand maunds. There was practically no loss in recovery, and issues for the current rabi are on a considerably increased scale, while arrangements are being made to procure stocks of kharíf seeds for which a demand has arisen. The work is carried on at a small profit, which is devoted to extending operations : it does not at present admit of reducing the rate of interest. The keenest desire for seed continues to be manifested in the neighbourhood of Amethi, where the cultivators crowded to the railway station to await the arrival of the imported seed ; but in other localities also the services of the Department are cordially welcomed.

Boring for wells.

68. The services of the trained supervisor appointed last year to control the staff of borers and to advise in cases of difficulty have been retained throughout the year under report. Altogether 146 trial borings were taken by the staff in different parts of the provinces. The supervisor himself inspected the sites of 170 wells and gave such advice as was required. A number of these wells belonged to private landholders who applied for advice, but the majority of them were on Government or Court of Wards' estates. The supervisor has made a special study of the wells in the Tarái and in the bitter-water tract in Etah and has given advice which, it is hoped, will be found of material benefit. The trained staff is now too small to cope with the demands on it and will have to be strengthened by the appointment of *mistris* experienced in the art of sinking wells, and divers for whose services applications are sometimes received. Steps are being taken to train men for these duties. Some progress has been made in working out a simpler and more expeditious method of taking trial borings in ordinary soils, but the experiments are not yet complete.

Other kinds of assistance.

69. *Cattle breeding.*—Seven bulls have been issued during the year, while two remained at stud work in Cawnpore where they are appreciated. Proposals are now being matured to organise a regular supply of good bulls for the cattle districts in Bundelkhand. Arrangements have also been completed for holding five cattle shows,—two in Bundelkhand and three in North Oudh,—the prizes being provided by the Government of India.

70. *Veterinary Hospital.*—A small hospital is attached to the Cawnpore Experiment Station in which the cattle of the farm and the neighbouring villages are treated by a native Veterinary Assistant under the supervision of the Deputy Director. During the year under report 121 cattle were brought to the hospital for treatment.

71. *Advice regarding crop pests.*—A notice was published in the Department's vernacular journal informing the public that the Department would help them as far as it could in combating pests injurious to agricultural crops, if specimens of the pests were forwarded. Specimens of such pests have begun to come in from private agriculturists, and advice has been given for their destruction.

## CHAPTER V.

### Supply of information.

Publications.

72. The extra work on the land records and statistical sides of the Department, mentioned in a previous chapter, has prevented me from compiling any bulletins for the provincial series. The note on *usar* mentioned in last year's report was issued as Agricultural Ledger No. 13 of 1901. The Assistant Director's monograph on sugar is still delayed in the Press, owing, I understand, to the non-receipt of some of the plates, but its publication is expected very shortly. A popular bulletin on the preservation of cattle urine for manure was distributed during the year. Another on the best methods of dealing with locusts was drafted, but is held in abeyance as the foretold invasion of the plains has not yet occurred.

Agricultural Journal.

73. The publication of the journal under the title *Mufid-ul-mazarein* has continued throughout the year. The circulation has risen by about one-eighth, which may be taken as evidence that the attempt to give it a more popular tone is appreciated. The number of copies issued monthly has varied between 400 and 438.

Summary of correspondence.

74. The Department has had 893 private correspondents during the past year, the great majority of the communications consisting of requests for seed or implements. It is not, however, possible to classify the correspondence with exactitude as many of the letters received deal with a great variety of subjects, not all of them strictly within the scope of the Department. Endeavours have however been made to collect and supply the required information in all cases: I hope this branch of activity will increase as it becomes known that communications will be welcomed on all matters of agricultural interest.

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## CHAPTER VI.

### Associations, Shows and Demonstrations.

Agricultural Associations.

75. A meeting of the Managers of Court of Wards' estates was held at Cawnpore in November, the Junior Member and Joint Secretary of the Board of Revenue and nearly all the managers taking part in it. Numerous subjects of agricultural interest were discussed, and I trust that the results were as valuable to the Court of Wards as the discussions were interesting to the officers of the Department.

76. No reports have been received from the Porter Association of Allahabad or the Bijnor Association; nor have I received any further communication from the organisers of the proposed association in Budaun. Individual members of the two associations continue to take practical measures for the improvement of agriculture in their neighbourhood, notably Rai Bahadur Thakur Mahabir Prasad Narayan Singh, whose activity in distributing good seed and in spreading information among cultivators is cordially appreciated.

77. Learning that the Vaishya Conference was meeting in Cawnpore during Christmas week I invited its members to visit the experiment station: a very large number of members accepted the invitation and discussed with keen interest the work that was in progress.

Agricultural Shows.

78. Shows were held during the year at Kakora (Budaun), Khairabad (Sítápur), Aligarh, Bulandshahr, Muzaffarnagar, Meerut and Sultánpur. The last two were attended by the Assistant Director, the remainder by other departmental officials. A certain amount of useful work is done at these shows, but the complaint—not unknown in other countries—that

the primary objects of the show suffer from the excess of counter-attractions, is to a certain extent justified. In the Sultánpur show, however, a separate report on which was submitted to Government, agricultural matters received due prominence and the interest in the subject manifested by practical agriculturists was most encouraging. At the other shows there were few novel features of interest. Steps were taken to exclude fraudulent exhibits of produce from the Meerut show, and the number of exhibits fell accordingly. At Muzaffarnagar the samples of sugar exhibited were frequently adulterated with beet sugar to improve their colour. It is unfortunate that the shows which offer the most valuable prizes for cattle are held in districts where there is little or no breeding: this defect is, however, being remedied by the cattle shows which are being organised in breeding districts as mentioned in a previous chapter.

Demonstration Farms.

79. The condition of the Meerut Demonstration Farm has been the subject of discussion during the year, as the result of which several changes have been decided on. The control of the farm is now vested entirely in the Department instead of being shared with the district board: the area is being reduced by the abandonment of the outlying land imperfectly provided with irrigation facilities; and the operations of the farm are to be confined strictly to the demonstration of improved methods, all experimental work being excluded. These changes were ordered after the close of the year under report; the work of the year was carried on under the old programme, and was in many respects unsatisfactory. It need not be noticed in greater detail.

80. The small farm at Sultánpur, managed by Kazi Muhammad Taki on his own responsibility, has done useful work in exhibiting different varieties of crops: the value of this farm is injuriously affected by deficiency in the water supply. No. report has reached me this year on the Jatau farm owned by Kuar Karan Singh.

Sugar factory.

81. A portable sugar factory, designed by the Department as an improvement on the Rohilkhand *bél* system of manufacture, was exhibited at work in various towns during the cold weather. Its original arrangement was largely experimental and was modified from time to time in accordance with the experience gained. The sugar manufacturers showed much interest in the improvements suggested, and arrangements are being made to work the factory continuously during the ensuing season so as to determine the financial results more accurately than could be done when moving from place to place. At present the factory turns out what is technically raw sugar, though in quality it is far superior to the ordinary *potlí* and is fairly comparable with the lower grades of refined sugar. Many manufacturers have now expressed a desire to see a refinery added to the factory, and the details of this are at present being worked out, the most efficient indigenous substitutes for animal charcoal as a decolorizer forming the main subject for experiment.

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## CHAPTER VII.

### Agricultural education.

The Agricultural School.

82. The Principal, Mr. P. V. Subbiah, has left the school, having received an important post under the Madras Court of Wards. Whatever success the school has achieved has been due mainly to Mr. Subbiah, who combines the qualifications of a teacher and a practical agriculturist in a rare degree. His health, however, was never good in Cawnpore, and when the opportunity came of a suitable appointment in his own province I did not feel justified in standing in his way. The post of Principal has been filled by the appointment of Mr. B. V. Patwardhan, who has been working under Mr. Subbiah for some years.

83. The final examination was held in April by the officers of the Department, and the results were again satisfactory, no student failing to pass and a large proportion passing in the first division which represents a high standard of proficiency. The number of admissions in July was the highest on record: as usual a few students left after seeing what the course was like, but 28 have remained. The numbers of the school are now 55.

84. The course of studies and practical work has remained substantially unchanged during the year. An addition to the school institutions is the cattle club, organised on the students' initiative, the object of which is to maintain working cattle for the school cultivation, thus avoiding the difficulty of hiring cattle at busy seasons and at the same time affording experience in the practical management of stock. The other clubs, riding, debating, library and recreation, have worked satisfactorily.

85. The work of the school is still hampered by the unsuitable nature of the buildings, especially the laboratory. The new reading room has, however, proved of much value as a common meeting place, and the existing buildings can be made to serve until a decision has been reached on the question of establishing an agricultural college. Funds have been allotted during the year for two most valuable improvements: the provision of an adequate supply of microscopes and other apparatus; and the purchase of a small scientific library where the best of the students can pursue their studies beyond the limits of the school course and the staff can extend and develope their knowledge of particular subjects.

86. The drainage and sanitation of the premises have been completed during the year, and the health of the students has been very satisfactory.

Moradabad Normal School.

87. The agricultural class established in the previous year at the Moradabad Normal School has progressed on the whole satisfactorily. The first batch of students will not pass out until next April, and no opinion can be expressed as yet whether the training which it is possible to give without detriment to the rest of the course will prove sufficient for the duties which the students will have to undertake. The management of the school farm has been satisfactory: the land was exceedingly bad when first taken over, and will need very careful farming to bring it into condition, but some improvement has already resulted.

Village schools.

88. The only action taken by the Department during the year has been the supply of vernacular notes on various field crops and on fruit trees, which are intended for the use of teachers in their practical lessons.

Royal Agricultural College.

89. The Government scholarship-holder, Sheikh Maqbul Husain, B.A., has completed a prosperous career at the Royal Agricultural College by winning the gold medal at the final examination. He has not yet returned to this country.

## CHAPTER VIII.

### Miscellaneous.

Village banks.

90. The organization of most of the existing banks having been completed, the number of inspectors has been reduced to one, who is employed in examining their working, auditing their accounts and submitting suggestions for their improvement to District Officers. As was only to be expected, a good many of the banks started at short notice in 1901 are dropping out, but a considerable number are showing their ability to handle wisely the small amount of capital that has been placed at their disposal, and one or two are beginning to build up a small deposit-capital

for themselves. As I have recently pointed out in a note submitted to Government, the principal requisite at the present time appears to be some more efficient central body than the existing organization societies.

Export of hemp.

91. The endeavours to secure that the hemp exported from Rohilkhand should be properly prepared and cleaned were noticed briefly in last year's report. Information received from a Bombay exporting firm shows that the improvement noticed last year has been maintained, and the recent establishment of some local presses for baling hemp suggests that those engaged in the trade have confidence in its permanence.

Conclusion.

92. This report has been compiled somewhat hastily in order that it might be completed before my departure on leave, and the treatment of some branches of the Department's work is necessarily rather summary; but I have endeavoured to set forth in such detail as is possible the leading features of the year's work. I desire to express my acknowledgments of the work done by my staff during the year: the principal burthen of the extra work has fallen on the statistical section of my office and on my Personal Assistant, Mir Saiyid Husain, who has worked unremittingly and with success.

I have the honour to be,

SIR,

Your most obedient servant,

W. H. MORELAND,

*Director.*

*Statement showing classification of holdings and rental statistics for* 1308 *fasli of the Agra Province.*

| District. | Area of holdings. | | | | | | | | Uncultivated land included in holdings. |
|---|---|---|---|---|---|---|---|---|---|
| | Sír. | Held by zamíndárs other than sír. | Held without rent. | Held by privileged or ex-proprietary tenants with privileged rights. | Held by privileged or occupancy tenants with occupancy rights. | Held without declared rights. | | Total area of holdings, columns 2 to 7(*b*). | |
| | | | | | | For 12 years or more. | For less than 12 years. | | |
| 1 | 2 | 3 | 4 | 5 | 6 | 7(*a*) | 7(*b*) | 8 | 9 |
| | Acres. | Acres. | Acres. | Acres. | Acres. | Acres. | Acres. | Acres. | Acres. |
| Dehra Dún ... | 7,341 | 27,054 | 600 | 53 | 14,431 | 5,742 | 47,572 | 102,793 | 5,172 |
| Saháranpur ... | 184,406 | 150,442 | 8,059 | 7,609 | 159,936 | 37,333 | 354,011 | 901,796 | 32,175 |
| Muzaffarnagar ... | 146,043 | 95,688 | 5,938 | 10,183 | 215,593 | 27,515 | 259,712 | 760,672 | 22,996 |
| Meerut ... | 248,725 | 245,762 | 16,824 | 12,667 | 272,889 | 16,210 | 313,682 | 1,126,759 | 16,717 |
| Bulandshahr ... | 112,195 | 67,395 | 6,083 | 9,997 | 382,439 | 45,129 | 303,992 | 927,230 | 29,022 |
| Aligarh† ... | 373 | 151,546 | 10,371 | 6,670 | 238,750 | 162,628 | 377,504 | 947,842 | 30,172 |
| Total ... | 699,083 | 737,887 | 47,875 | 47,179 | 1,284,038 | 294,557 | 1,656,473 | 4,767,092 | 136,254 |
| Muttra ... | 93,844 | 116,997 | 9,769 | 7,973 | 175,910 | 96,507 | 252,270 | 753,270 | 21,935 |
| Agra ... | 111,199 | 32,490 | 14,420 | 17,606 | 300,279 | 158,591 | 204,210 | 838,795 | 36,277 |
| Farrukhabad† ... | 80,908 | 24,121 | 22,173 | 11,065 | 300,971 | 96,407 | 119,945 | 655,590 | 112,230 |
| Mainpuri‡ ... | 61,382 | 18,849 | 32,087 | 9,029 | 271,957 | 124,241 | 117,788 | 635,333 | 53,294 |
| Etáwah ... | 47,986 | 16,745 | 33,770 | 5,180 | 220,485 | 149,668 | 116,940 | 590,774 | 34,997 |
| Etah† ... | 79,081 | 26,548 | 18,563 | 16,909 | 285,808 | 111,864 | 195,204 | 733,977 | 72,934 |
| Total ... | 474,400 | 235,750 | 130,782 | 67,762 | 1,555,410 | 737,278 | 1,006,357 | 4,207,739 | 331,667 |
| Bareilly‡ ... | 27,692 | 23,867 | 11,647 | 6,442 | 435,833 | 84,859 | 217,436 | 807,776 | 38,358 |
| Bijnor ... | 47,462 | 44,741 | 25,235 | 4,470 | 283,168 | 43,181 | 263,794 | 712,051 | 62,023 |
| Budaun ... | 121,082 | 29,135 | 10,992 | 20,928 | 485,424 | 48,728 | 262.285 | 978,574 | 27,270 |
| Moradabad ... | 55,097 | 55,964 | 3,534 | 10,506 | 413,802 | 202,865 | 369,310 | 1,111,078 | 73,853 |
| Sháhjahánpur† ... | 76,918 | 34,409 | 6,138 | 12,297 | 261,301 | 162,721 | 248,035 | 801,819 | 90,988 |
| Pilibhít † ... | 992 | 17,187 | 6,857 | 1,847 | 118,643 | 115,707 | 154,621 | 415,854 | 40,214 |
| Total ... | 329,243 | 205,303 | 64,403 | 56,490 | 1,998,171 | 658,061 | 1,515,481 | 4,827,152 | 332,706 |
| Cawnpore ... | 73,340 | 34,914 | 24,060 | 7,746 | 362,101 | 123,228 | 239,223 | 864,612 | 47,615 |
| Fatehpur ... | 47,721 | 40,040 | 12,291 | 1,988 | 268,133 | 122,959 | 120,624 | 613,756 | 70,405 |
| Bánda ... | 151,871 | 150,800 | 11,039 | 16,717 | 189,879 | 143,748 | 325,352 | 989,406 | 162,267 |
| Hamírpur ... | 147,857 | 105,541 | 13,997 | 22,153 | 110,670 | 121,518 | 272,188 | 793,924 | 137,786 |
| Allahabad ... | 131,865 | 44,121 | 44,020 | 7,359 | 528,988 | 219,770 | 234,619 | 1,210,742 | 176,844 |
| Jhánsi ... | 114,476 | 138,138 | 46,451 | 9,377 | 186,240 | 91,570 | 272,200 | 858,452 | 206,320 |
| Jalaun† ... | 95,353 | 81,275 | 12,066 | 9,173 | 80,112 | 74,517 | 208,017 | 560,513 | 61,260 |
| Total ... | 762,483 | 594,829 | 163,924 | 74,513 | 1,726,123 | 897,310 | 1,672,223 | 5,891,405 | 862,497 |
| Benares ... | 80,896 | 20,635 | 5,848 | 92,178 | 179,490 | 27,974 | 36,246 | 442,767 | 32,450 |
| Mirzapur ... | 118,772 | 61,470 | 12,605 | 1,25,998 | 136,395 | 116,449 | 166,673 | 738,362 | 192,635 |
| Jaunpur ... | 99,287 | 30,979 | 7,763 | 3,00,864 | 151,462 | 57,528 | 42,109 | 689,992 | 53,053 |
| Gházipur ... | 188,521 | 24,276 | 4,512 | 78,494 | 249,464 | 69,648 | 45,878 | 660,793 | 64,036 |
| Ballia ... | 156,078 | 17,106 | 11,343 | 1,18,363 | 196,575 | 54,656 | 54,348 | 608,469 | 62,070 |
| Total ... | 643,554 | 154,466 | 41,571 | 715,897 | 913,386 | 326,255 | 345,254 | 3,140,383 | 404,244 |
| Gorakhpur ... | 278,225 | 246,922 | 33,121 | 7,168 | 762,962 | 371,911 | 438,060 | 2138,369 | 119,843 |
| Basti ... | 183,425 | 224,484 | 3,546 | 2,380 | 284,004 | 235,819 | 349,635 | 1283,293 | 34,852 |
| Azamgarh ‡ ... | 293,078 | 57,810 | 5,236 | 9,313 | 276,449 | 135,963 | 82,854 | 860,703 | 90,991 |
| Total ... | 754,728 | 529,216 | 41,903 | 18,861 | 1,323,415 | 743,693 | 870,549 | 4,282,365 | 245,686 |
| Naini Tál (Tarái parganas only). | 3,869 | 4,419 | 1,587 | 128 | 15,554 | 36,821 | 138,899 | 2,01,277 | 13,003 |
| Total Agra Province. | 3,667,360 | 2,461,870 | 492,045 | 980,830 | 8,816,097 | 3,693,975 | 7,205,236 | 27,317,413 | 2,326,057 |

† Figures for 1900-1901 have not been received owing to survey or settlement operations being in progress; hence figures for 1899-1900 have been repeated.

‡ Figures for only a portion of the district are for 1900-1901; those for the remaining portions have been taken from previous years' returns.

*Statement showing classification of holdings and rental*

| District. | Rent free and nominally rented area (columns 2 to 4.) | Cash-rented land. * | | | | | | Grain-rented | Rental |
|---|---|---|---|---|---|---|---|---|---|
| | | Privileged and occupancy tenants. | | Tenants without declared rights. | | Total. | | | |
| | | Area. | Rent. | Area. | Rent. | Area. | Rent. | Area. | |
| 1 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | |
| | Acres. | Acres. | Rs. | Acres. | Rs. | Acres. | Rs. | Acres. | |
| Dehra Dún ... ... | 34,995 | 14,484 | 37,404 | 53,314 | 2,35,703 | 38,114 | 1,65,459 | 29,684 | |
| Saháranpur ... ... | 342,907 | 160,204 | 6,55,800 | 292,465 | 15,79,360 | 452,669 | 22,35,160 | 106,220 | |
| Muzaffarnagar ... ... | 247,669 | 217,008 | 9,85,714 | 222,582 | 16,02,638 | 439,590 | 25,88,352 | 73,413 | |
| Meerut ... ... | 511,311 | 279,758 | 14,63,391 | 304,988 | 25,29,432 | 584,746 | 39,92,823 | 30,702 | |
| Bulandshahr ... ... | 185,673 | 390,832 | 18,25,258 | 341,944 | 25,43,011 | 732,776 | 43,68,269 | 8,781 | |
| Aligarh† ... ... | 162,290 | 245,420 | 12,81,019 | 540,132 | 33,37,937 | 773,964 | 45,75,082 | 11,588 | |
| Total ... | 1,484,845 | ... | ... | ... | ... | 3,021,859 | 1,79,25,145 | 260,388 | |
| Muttra ... ... | 220,610 | 183,883 | 7,73,444 | 348,777 | 18,24,403 | 532,626 | 25,97,722 | 34 | |
| Agra ... ... | 158,109 | 317,885 | 14,22,904 | 362,801 | 18,16,335 | 680,686 | 32,39,239 | ... | |
| Farrukhabad† ... ... | 127,202 | 312,036 | 12,65,192 | 216,352 | 8,58,646 | 525,779 | 21,18,501 | 2,609 | |
| Mainpuri‡ ... ... | 112,318 | 280,986 | 12,09,383 | 242,029 | 11,99,837 | 519,550 | 24,02,442 | 3,465 | |
| Etáwah ... ... | 98,501 | 225,665 | 11,03,732 | 266,608 | 13,84,670 | 491,658 | 24,86,710 | 615 | |
| Etah† ... ... ... | 124,192 | 302,717 | 11,20,949 | 307,068 | 12,18,808 | 604,474 | 23,28,266 | 5,311 | |
| Total ... | 840,932 | ... | ... | . | ... | 3,354,773 | 1,51,72,880 | 12,034 | |
| Bareilly ... ... | 63,206 | ... | ... | ... | ... | 563,618 | 24,79,129 | 180,952 | |
| Bijnor ... ... | 117,438 | 229,406 | 12,93,661 | 178,716 | 10,97,249 | 408,122 | 23,90,910 | 186,491 | |
| Budaun ... ... | 161,209 | 500,496 | 16,80,130 | 299,329 | 11,20,427 | 799,825 | 28,00,557 | 17,540 | |
| Moradabad ... ... | 114,595 | 424,308 | 16,83,163 | 572,175 | 25,78,018 | 706,888 | 31,27,790 | 289,595 | |
| Sháhjahánpur† ... .. | 117,465 | 273,598 | 9,36,832 | 410,756 | 13,49,491 | 678,274 | 22,73,857 | 6,080 | |
| Pilibhít† ... ... | 25,036 | 120,490 | 5,09,372 | 270,328 | 9,00,909 | 268,465 | 10,02,994 | 122,353 | |
| Total ... | 598,949 | ... | ... | ... | ... | 3,425,192 | 1,40,75,237 | 803,011 | |
| Cawnpore ... ... | 132,314 | 369,847 | 18,19,057 | 362,451 | 18,91,817 | 732,278 | 37,10,763 | 20 | |
| Fatehpur ... ... | 100,052 | 270,121 | 11,83,624 | 243,583 | 10,06,641 | 513,278 | 21,89,179 | 426 | |
| Bánda ... ... | 313,710 | 206,128 | 4,94,049 | 468,494 | 10,46,259 | 674,622 | 15,40,308 | 1,074 | |
| Hamírpur ... ... | 267,395 | 132,822 | 3,42,889 | 392,844 | 8,65,978 | 525,666 | 12,08,867 | 863 | |
| Allahabad ... ... | 220,006 | 536,347 | 24,14,504 | 454,389 | 18,45,584 | 989,314 | 42,56,755 | 1,422 | |
| Jhánsi ... ... | 299,065 | 195,615 | 3,53,931 | 363,419 | 5,06,211 | 559,034 | 8,60,142 | 353 | |
| Jalaun† ... ... | 188,694 | 89,285 | 3,01,458 | 282,534 | 9,40,979 | 371,783 | 12,42,376 | 36 | |
| Total ... | 1,521,236 | ... | ... | ... | ... | 4,365,975 | 1,50,08,390 | 4,194 | |
| Benares ... ... | 106,879 | 271,668 | 11,19,239 | 64,220 | 3,23,707 | 326,995 | 14 27,249 | 8,893 | |
| Mirzapur ... ... | 192,847 | 262,393 | 8,28,320 | 283,122 | 5,96,675 | 493,429 | 13,65,082 | 52,086 | |
| Jaunpur ... ... | 138,029 | 452,326 | 19,54,638 | 99,637 | 3,95,742 | 536,886 | 23,21,965 | 15,077 | |
| Gházipur ... ... | 217,309 | 327,958 | 13,03,082 | 115,526 | 5,68,013 | 426,358 | 18,53,829 | 17,126 | |
| Ballia ... ... | 184,527 | 314,938 | 12,45,595 | 109,004 | 4,34,079 | 409,054 | 16,48,220 | 14,888 | |
| Total ... | 839,591 | ... | | ... | ... | 2,192,722 | 86,16,345 | 108,070 | |
| Gorakhpur ... ... | 558,268 | 769,335 | 23,00,431 | 809,228 | 22,02,070 | 1,578,563 | 45,02,501 | 1,538 | |
| Basti ... ... | 411,455 | 283,290 | 11,48,066 | 565,062 | 22,31,160 | 848,352 | 33,79,226 | 23,486 | |
| Azamgarh‡ ... ... | 356,124 | 285,762 | 14,60,729 | 218,817 | 11,10,905 | 481,726 | 25,09,041 | 22,853 | |
| Total ... | 1,325,847 | ... | ... | ... | ... | 2,908,641 | 1,03,90,768 | 47,877 | |
| Naini Tál (Tarái parganas only), | 9,875 | 15,682 | 52,636 | 175,720 | 3,81,692 | 149,805 | 3,32,465 | 41,597 | |
| Total Agra Province ... | 6,621,275 | ... | .. | ... | ... | 19,418,967 | 8,15,21,230 | 1,277,171 | |

* In the eleven districts, Saháranpur, Muzaffarnagar, Meerut, Bulandshahr, Bijnor Budaun, Bánda, Hamirpur, Jhánsi, land only. In all other districts they include cash-rented and grain-rented land. Columns 15 and 16 show

† Figures for 1900-1901 have not been received owing to survey or settlement

‡ Figures for only a portion of the district are for 1900-1901; those for

*statistics for* 1308 *fasli of the Agra Province*—(concluded).

| statistics. | | | | | Collections. | | | | |
|---|---|---|---|---|---|---|---|---|---|
| land. | Total cash and grain-rented land. | | Sewai demand. | Total demand | For present year. | For previous years. | Total collection. | Percentage of total collection to demand. | Corrected rent-roll. |
| Rent. | Area. | Rent. | | | | | | | |
| 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 |
| Rs. | Acres. | Rs. | Rs. | Rs. | Rs. | Rs. | Rs. | | Rs. |
| 1,07,648 | 67,798 | 2,73,107 | 73,323 | 3,46,430 | 3,28,803 | 24,612 | 3,53,415 | 102 | 4,08,257 |
| 5,61,203 | 558,889 | 27,96,363 | 16,213 | 28,12,576 | 22,03,645 | 4,70,794 | 26,74,439 | 95 | 45,05,679 |
| 3,38,558 | 513,003 | 29,26,910 | 28,252 | 29,55,162 | 24,08,967 | 4,63,068 | 28,72,035 | 97 | 44,14,087 |
| 1,63,839 | 615,448 | 41,56,662 | 98,532 | 42,55,194 | 31,68,039 | 6,05,639 | 37,73.678 | 89 | 77,46,489 |
| 52,863 | 741,557 | 44,21,132 | 81,273 | 45,02,405 | 36,42,177 | 7,49,613 | 43,91,790 | 98 | 56,09,674 |
| 43,874 | 785,552 | 46,18,956 | 62,988 | 46,81,944 | 38,11,848 | 4,90,651 | 43,02,499 | 92 | 56,41,315 |
| 12,67,985 | 3,282,247 | 1,91,93,130 | 3,60,581 | 1,95,53,711 | 1,55,63,479 | 28,04,377 | 1,83,67,856 | 94 | 2,84,15,501 |
| 125 | 532,660 | 25.97,847 | 31,318 | 26.29,165 | 19,68,375 | 5,54,947 | 25,23,322 | 96 | 37,04,639 |
| ... | 680,686 | 32,39,239 | 29,248 | 32,68,487 | 23,46,238 | 7,89,319 | 31,35,557 | 96 | 40,21,152 |
| 5,337 | 528,388 | 21,23,838 | 23,051 | 21,46,889 | 12,24,961 | 4,72,071 | 16,97,032 | 79 | 26,59,672 |
| 6,778 | 523,015 | 24,09,220 | 22,196 | 24,31,416 | 17,33,117 | 5,24,103 | 22,57,220 | 93 | 29,50,887 |
| 1,692 | 492,273 | 24,88,402 | 27,566 | 25,15,968 | 19,38,638 | 3,72,317 | 23,10,955 | 92 | 30,14,116 |
| 11,491 | 609,785 | 23,39,757 | 43,153 | 23,82,910 | 16,33,651 | 5,12,873 | 21,46,524 | 90 | 28,61,567 |
| 25,423 | 3,366,807 | 1,51,98,303 | 1,76,532 | 1,53,74,835 | 1,08,44,980 | 32,25,630 | 1,40,70,610 | 92 | 1,92,12,033 |
| 7,71,974 | 744,570 | 32,51,103 | 1,11,091 | 33,62,194 | 27,79,171 | 4,15,483 | 31,94,654 | 95 | 36,40,366 |
| 7,80,168 | 594,613 | 31,71,078 | 47.916 | 32,18,994 | 23,97,542 | 7,31,960 | 31,29,502 | 97 | 39,07,107 |
| 40,232 | 817,365 | 28,40,789 | 19,802 | 28,60,591 | 22,76,846 | 6,97,849 | 29,74,695 | 104 | 34,24,822 |
| 11,33,391 | 996,483 | 42,61,181 | 57,700 | 43,18,881 | 34,78,150 | 7,28,914 | 42,07,064 | 97 | 48,26,203 |
| 12,466 | 684,354 | 22,86,323 | 78,146 | 23,64,469 | 16,11,714 | 4,15,652 | 20,27,366 | 86 | 27,58,466 |
| 4,07,287 | 390,818 | 14,10,281 | 73,773 | 14,84,054 | 10,18,552 | 2,50,434 | 12,68,986 | 86 | 15,77,548 |
| 31,45,518 | 4,228,203 | 1,72,20,755 | 3,88,428 | 1,76,09,183 | 1,35,61,975 | 32,40,292 | 1,68,02,267 | 95 | 2,01,34,512 |
| 111 | 732,298 | 37,10,874 | 66,979 | 37,77,853 | 29,47,895 | 6,47,588 | 35,95,483 | 95 | 44,48,382 |
| 1,086 | 513,704 | 21,90,265 | 70,179 | 22,60,444 | 18,48,553 | 3,21,514 | 21,70,067 | 96 | 26,87,228 |
| 326 | 675,696 | 15,40,634 | 70,467 | 16,11,101 | 13,39,157 | 1,76,863 | 15,16,020 | 94 | 23,26,752 |
| 2,670 | 526,529 | 12,11,537 | 19,685 | 12,31,222 | 10,33,195 | 76,983 | 11,10,178 | 90 | 18,46,788 |
| 3,333 | 990,736 | 42,60,088 | 39,264 | 42,99,352 | 29,35,969 | 10,02,915 | 39,38,884 | 92 | 52,45,836 |
| 1,027 | 559,287 | 8,61,169 | 19,276 | 8,80,445 | 7,47,841 | 50,523 | 7,98,364 | 91 | 13,39,946 |
| 61 | 371,819 | 12,42,437 | 11,882 | 12,54,319 | 10,08,476 | 1,50,711 | 11,59,187 | 92 | 18,85,265 |
| 8,614 | 4,370,169 | 1,50,17,004 | 2,97,732 | 1,53,14,736 | 1,18,61,086 | 24,27,097 | 1,42,88,183 | 93 | 1,97,80,197 |
| 15,697 | 335,888 | 14,42,946 | 4,893 | 14,47,839 | 5,93,087 | 4,04,796 | 9,97,883 | 69 | 19,14,321 |
| 59,913 | 545,515 | 14,24,995 | 30,381 | 14,55,376 | 8,35,177 | 4,24,946 | 12,60,123 | 87 | 19,88,718 |
| 28,41[illegible] | 551,963 | 23,50,380 | 3,836 | 23,54,216 | 13,52,377 | 5,72,141 | 19,24,518 | 82 | 29,50,904 |
| 17,266 | 443,484 | 18,71,095 | 11,026 | 18,82,121 | 9,67,157 | 5,11,756 | 14,78,913 | 79 | 28,27,189 |
| 31,454 | 423,942 | 16,79,674 | 16,447 | 16,96,121 | 8,86,358 | 2,68,198 | 11,54,556 | 68 | 24,39,995 |
| 1,52,745 | 2,300,792 | 87,69,090 | 66,583 | 88,35,673 | 46,34,156 | 21,81,837 | 68,15,993 | 77 | 1,21,21,127 |
| 5,208 | 1 580,101 | 45,07,709 | 1,95,228 | 47,02,937 | 42,78,550 | 2,40,346 | 45,18,896 | 96 | 62,96,327 |
| 70,056 | 871,838 | 34,49,282 | 39,236 | 34,88,518 | 34,04,4 3 | 39,699 | 34,44,142 | 99 | 51,27,909 |
| 62,593 | 504,579 | 25,71,634 | 15,491 | 25,87,125 | 21,72,940 | 2,93,886 | 24,66,826 | 95 | 44,41,937 |
| 1,37,857 | 2,956,518 | 1,05,28,625 | 2,49,955 | 1,07,78,580 | 98,55,933 | 5,73,931 | 1,04,29,864 | 97 | 1,58,66,173 |
| 1,01,863 | 191,402 | 4,34,328 | 10,772 | 4,45,100 | 4,20,733 | 20,233 | 4,40,966 | 99 | 4,67,010 |
| 48,40,005 | 20,696,138 | 8,63,61,235 | 15,50,583 | 8,79,11,818 | 6,67,42,342 | 1,44,73,397 | 8,12,15,739 | 92 | 11,59,96,553 |

Gorakhpur and Basti where new forms of mauza registers have been introduced, columns 11—14 include cash-rented
for all districts cash-rented land only and consequently are not the sum of columns 11, 13 and 12, 14.
operations being in progress; hence figures for 1899-1900 have been repeated.
the remaining portions have been taken from previous years' returns.

*Statement showing classification of holdings and rental*

| District. | Area of holdings. | | | | | | | | Uncultivated land included in holdings. |
|---|---|---|---|---|---|---|---|---|---|
| | Sír. | Held by zamíndárs other than sír. | Held without rent. | Held by privileged or ex-proprietary tenants with privileged rights. | Held by privileged or occupancy tenants with occupancy rights. | Held without declared rights. | | Total area of holdings, columns 2 to 7(*b*). | |
| | | | | | | For 12 years or more. | For less than 12 years. | | |
| 1 | 2 | 3 | 4 | 5 | 6 | 7(*a*) | 7(*b*) | 8 | 9 |
| | Acres. | Acres. | Acres. | Acres. | Acres. | Acres. | Acres. | Acres. | Acres. |
| Dehra Dún ... | 7,529 | 27,586 | 572 | 58 | 14,497 | 5,879 | 45,928 | 102,049 | 5,680 |
| Sahárapur ... | 182,687 | 153,832 | 8.042 | 8.228 | 158,306 | 38,554 | 355,974 | 905,623 | 38,763 |
| Muzaffarnagar ... | 145,281 | 96,611 | 5,939 | 10,245 | 215,602 | 28.512 | 260,101 | 762,291 | 31,447 |
| Meerut ... | 248,126 | 245,976 | 19,226 | 12,355 | 272,135 | 19,202 | 317,584 | 1,134,604 | 40,747 |
| Bulandshahr ... | 111,243 | 72,357 | 3,598 | 10,432 | 382,404 | 46,289 | 305,570 | 931,893 | 37,270 |
| Aligarh† ... | 373 | 151,546 | 10,371 | 6,670 | 238,750 | 162,628 | 377,504 | 947,842 | 30,172 |
| Total ... | 695,239 | 747,908 | 47,748 | 47,988 | 1,281,694 | 301,064 | 1,662,661 | 4,784,302 | 184,079 |
| Muttra ... | 93 324 | 117,301 | 9,825 | 7,974 | 174,488 | 99.266 | 258,157 | 760,335 | 46,480 |
| Agra ... | 109,985 | 32,563 | 14,419 | 17,600 | 298,295 | 166,942 | 204,415 | 844,219 | 40,090 |
| Farrukhabad† ... | 80,908 | 24,121 | 22,173 | 11,065 | 300,971 | 96,407 | 119,945 | 655,590 | 112,230 |
| Mainpurí† ... | 61,382 | 18.849 | 32,087 | 9,029 | 271,957 | 124.241 | 117,788 | 635,333 | 53,294 |
| Etáwah ... | 47,785 | 16,855 | 35,310 | 5,383 | 218,135 | 159,862 | 110,515 | 593,845 | 35,759 |
| Etah † ... | 79,081 | 26,548 | 18,563 | 16,909 | 285,808 | 111,864 | 195,204 | 733,977 | 72,934 |
| Total ... | 472,465 | 236,237 | 132,377 | 67,960 | 1,549,654 | 758,582 | 1,006,024 | 4,223,299 | 360,787 |
| Bareilly‡ ... | 28,009 | 24,713 | 11,883 | 6,744 | 435,369 | 89,589 | 219,292 | 815,599 | 43,224 |
| Bijnor‡ ... | 47,017 | 46,007 | 36,091 | 4,473 | 279,673 | 48,685 | 258,096 | 720,042 | 59,419 |
| Budaun ... | 119,808 | 30,495 | 11,055 | 21,700 | 484,125 | 57,794 | 277,688 | 1,002,665 | 29,425 |
| Moradabad ... | 54,509 | 58,132 | 3,571 | 10,829 | 411,458 | 209,267 | 384,261 | 1,132,027 | 69,790 |
| Sháhjahánpur† ... | 76,918 | 34,409 | 6,138 | 12,297 | 261,301 | 162,721 | 248,035 | 801,819 | 90,988 |
| Pilibhít† ... | 992 | 17,187 | 6,857 | 1,847 | 118,643 | 115,707 | 154,621 | 415,854 | 40,214 |
| Total ... | 327,253 | 210,943 | 75,595 | 57,890 | 1,990,569 | 683,763 | 1,541,993 | 4,888,006 | 333,060 |
| Cawnpore ... | 72,461 | 36,061 | 24,879 | 8,210 | 360,097 | 134,201 | 242,808 | 878,717 | 38,283 |
| Fatehpur ... | 47,337 | 39,537 | 12,238 | 2,111 | 266,006 | 126,778 | 126,689 | 620,696 | 63,895 |
| Bánda ... | 153,583 | 151,293 | 10,986 | 12,006 | 185.136 | 150,403 | 347,097 | 1,010,504 | 169,990 |
| Hamírpur ... | 145,279 | 104,863 | 14,847 | 23,782 | 108,326 | 126,842 | 301,917 | 825,856 | 131,201 |
| Allahabad ... | 130,509 | 43,820 | 45,523 | 8,139 | 520,486 | 223,026 | 242,769 | 1,214,272 | 170,877 |
| Jhánsi ... | 113,466 | 146,131 | 51,470 | 9,241 | 181,617 | 93,869 | 294,135 | 889,929 | 193,840 |
| Jalaun† ... | 95,353 | 81,275 | 12,066 | 9,173 | 80,112 | 74,517 | 208,017 | 560,513 | 61,260 |
| Total ... | 757,988 | 602,980 | 172,009 | 72,662 | 1,701,780 | 929,636 | 1,763,432 | 6,000,487 | 829,346 |
| Benares ... | 79,498 | 20,735 | 5,348 | 92,366 | 178,038 | 29,513 | 36,839 | 442,337 | 31,761 |
| Mirzapur ... | 119,120 | 63,083 | 16,587 | 124,982 | 135.825 | 121,107 | 171,927 | 752,631 | 204,217 |
| Jaunpur ... | 99,039 | 31,768 | 7,715 | 301,123 | 150,713 | 61,813 | 39,535 | 691,706 | 62,845 |
| Gházipur ... | 188,481 | 24,587 | 4,631 | 78,974 | 247,807 | 71'521 | 44,946 | 660,947 | 72,854 |
| Ballia ... | 155,758 | 17,000 | 11,254 | 117,491 | 193,667 | 55,942 | 50,335 | 601,447 | 65,443 |
| Total ... | 641,896 | 157,173 | 45,535 | 714,936 | 906,050 | 339,896 | 343,582 | 3,149,068 | 437,120 |
| Gorakhpur ... | 278,027 | 256,203 | 33,919 | 7,344 | 764,400 | 391,478 | 441,113 | 2,172,484 | 112,062 |
| Basti... ... | 183,206 | 239,539 | 3,530 | 2,435 | 282,043 | 238,001 | 349,001 | 1,297,755 | 34,478 |
| Azamgarh† .. | 293,078 | 57,810 | 5,236 | 9,313 | 276,449 | 135,963 | 82,854 | 860,703 | 90,991 |
| Total ... | 754,311 | 553,552 | 42,685 | 19,092 | 1,322,892 | 765,442 | 872,968 | 4,330,942 | 237,531 |
| Naini Tál (Tarái parganas only). | 3,754 | 4,530 | 2,097 | 120 | 15,139 | 36,714 | 134,255 | 196,609 | 12,731 |
| Total Agra Province | 3,652,906 | 2,513,323 | 518,046 | 980,648 | 8,767,778 | 3,815,097 | 7,324,915 | 27,572,713 | 2,394 654 |

* In the eleven districts, Sáháranpur, Muzaffarnagar, Meerut, Bulandshahr, Bijnor, Budaun, Bánda, Hamírpur, Jhánsi, Gorakhpur, and cash-rented and grain-rented land. Columns 15 and 16 show for all districts cash-rented land only, and consequently are not the sum of

† Figures for 1901-1902 have not been received owing to survey or settlement operations being in progress; hence figures for 1900-1901 have

‡ Figures for only a portion of the district are for 1901-1902; those for the remaining portions have been taken from previous years' returns.

*statistics for* 1309 *fasli of the Agra Province.*

| Rent-free and nominally-rented area (columns 2 to 4). | Rental statistics. | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Cash-rented land.* | | | | | | Grain-rented land. | | Total cash and grain-rented land. | |
| | Privileged and occupancy tenants. | | Tenants without declared rights. | | Total. | | Area. | Rent. | Area. | Rent. |
| | Area. | Rent. | Area. | Rent. | Area. | Rent. | | | | |
| 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 |
| Acres. | Acres. | Rs. | Acres. | Rs. | Acres. | Rs. | Acres. | Rs. | Acres. | Rs. |
| 35,687 | 14,555 | 36,178 | 51,807 | 2,09,840 | 37,607 | 1,68,470 | 28,755 | 77,548 | 66,362 | 2,46,018 |
| 344,561 | 159,459 | 6,68,293 | 295,517 | 16,51,231 | 454,976 | 23,19,524 | 106,086 | 4,11,403 | 561,062 | 27,30,927 |
| 247,831 | 216,920 | 9,93,308 | 229,346 | 17,02,001 | 446,266 | 26,95,309 | 68,194 | 2,40,465 | 514,460 | 29,35,774 |
| 513,328 | 279,083 | 15,01,483 | 309,697 | 26,78,539 | 588,780 | 41,80,019 | 32,496 | 1,27,626 | 621,276 | 43,07,645 |
| 187,198 | 391,239 | 18,48,527 | 342,739 | 26,44,238 | 733,978 | 44,92,765 | 10,717 | 48,295 | 744,695 | 45,41,060 |
| 162,290 | 245,420 | 12,81,019 | 540,132 | 33,37,937 | 773,964 | 45,75,082 | 11,588 | 43,874 | 785,552 | 46,18,956 |
| 1,490,895 | ... | ... | ... | ... | 3,035,571 | 1,84,31,169 | 257,836 | 9,49,211 | 3,293,407 | 1,93,80,380 |
| 220,450 | 182,462 | 7,67,492 | 357,423 | 18,96,452 | 539,885 | 26,63,944 | ... | ... | 539,885 | 26,63,944 |
| 156,967 | 315,895 | 14,13,378 | 371,357 | 18,73,648 | 687,252 | 32,87,021 | ... | ... | 687,252 | 32,87,021 |
| 127,202 | 312,036 | 12,65,192 | 216,352 | 8,58,646 | 525,979 | 21,18,501 | 2,609 | 5,337 | 528,388 | 21,23,838 |
| 112,318 | 280,980 | 12,09,383 | 242,029 | 11,99,837 | 519,550 | 24,02,442 | 3,465 | 6,778 | 523,015 | 24,09,220 |
| 99,950 | 223,518 | 10,96,219 | 270,377 | 14,35,117 | 493,039 | 25,29,090 | 856 | 2,246 | 493,895 | 25,31,336 |
| 124,192 | 302,717 | 11,20,949 | 307,068 | 12,18,808 | 604,474 | 23,28,266 | 5,311 | 11,491 | 609,785 | 23,39,757 |
| 841,079 | ... | ... | ... | ... | 3,369,979 | 1,53,29,264 | 12,241 | 25,852 | 3,382,220 | 1,53,55,116 |
| 64,605 | ... | ... | ... | ... | 580,878 | 25,95,519 | 170,116 | 7,19,472 | 750,994 | 33,14,991 |
| 129,115 | 226,522 | 12,78,387 | 185,109 | 11,43,871 | 411,631 | 24,22,258 | 179,296 | 6,04,192 | 590,927 | 30,26,450 |
| 161,358 | 500,029 | 16,87,065 | 322,663 | 12,20,118 | 822,692 | 29,07,183 | 18,615 | 36,876 | 841,307 | 29,44,059 |
| 116,212 | 422,287 | 16,05,873 | 593,528 | 23,69,429 | 709,824 | 31,38,816 | 305,991 | 8,36,486 | 1,015,815 | 39,75,302 |
| 117,465 | 273,598 | 9,36,832 | 410,756 | 13,49,491 | 678,274 | 22,73,857 | 6,080 | 12,466 | 684,354 | 22,86,323 |
| 25,036 | 120,490 | 5,09,372 | 270,328 | 9,00,909 | 268,465 | 10,02,994 | 122,353 | 4,07,287 | 390,818 | 14,10,281 |
| 613,791 | ... | ... | ... | ... | 3,471,764 | 1,43,40,627 | 802,451 | 26,16,779 | 4,274,215 | 1,69,57,406 |
| 133,401 | 368,307 | 18,10,524 | 377,009 | 19,70,141 | 745,307 | 37,80,618 | 9 | 47 | 745,316 | 37,80,665 |
| 99,112 | 268,117 | 11,75,180 | 253,467 | 10,46,031 | 521,048 | 22,19,563 | 536 | 1,648 | 521,584 | 22,21,211 |
| 315,862 | 196,797 | 4,70,684 | 496,821 | 11,36,059 | 693,616 | 16,06,743 | 1,026 | 192 | 694,642 | 16,06,935 |
| 264,989 | 132,103 | 3,46,146 | 427,643 | 9,40,767 | 559,746 | 12,86,913 | 1,121 | 3,326 | 560,867 | 12,90,239 |
| 219,852 | 528,625 | 23,92,525 | 465,795 | 18,99,149 | 993,140 | 42,88,470 | 1,280 | 3,204 | 994,420 | 42,91,674 |
| 311,067 | 190,855 | 3,44,476 | 387,690 | 5,35,554 | 578,545 | 8,80,030 | 317 | 800 | 578,862 | 8,80,830 |
| 188,694 | 89,285 | 3,01,458 | 282,534 | 9,40,979 | 371,783 | 12,42,376 | 36 | 61 | 371,819 | 12,42,437 |
| 1,532,977 | ... | ... | ... | ... | 4,463,185 | 1,53,04,713 | 4,325 | 9,278 | 4,467,510 | 1,53,13,991 |
| 105,583 | 270,404 | 11,11,918 | 66,352 | 3,35,174 | 327,628 | 14,32,071 | 9,128 | 15,021 | 336,756 | 14,47,092 |
| 198,790 | 260,807 | 8,21,359 | 293,034 | 6,13,748 | 495,091 | 13,73,215 | 58,750 | 61,892 | 553,841 | 14,35,107 |
| 138,522 | 451,836 | 19,42,732 | 101,348 | 4,01,453 | 538,115 | 23,28,040 | 15,069 | 16,145 | 553,184 | 23,44,185 |
| 217,699 | 326,781 | 12,93,998 | 116,467 | 5,76,515 | 426,226 | 18,59,681 | 17,022 | 10,832 | 443,248 | 18,70,513 |
| 184,012 | 311,158 | 12,24,044 | 106,277 | 4,16,035 | 401,802 | 16,13,792 | 15,633 | 26,287 | 417,435 | 16,40,079 |
| 844,604 | ... | ... | ... | ... | 2,188,862 | 86,06,799 | 115,602 | 1,30,177 | 2,304,464 | 87,36,976 |
| 568,149 | 770,909 | 22,95,152 | 831,774 | 22,63,993 | 1,602,683 | 45,59,145 | 1,652 | 7,033 | 1,604,335 | 45,66,178 |
| 426,278 | 281,391 | 11,41,843 | 564,889 | 21,93,111 | 846,280 | 33,34,954 | 25,200 | 78,403 | 871,480 | 34,13,357 |
| 356,124 | 285,762 | 14,60,729 | 218,817 | 11,10,905 | 481,726 | 25,09,041 | 22,853 | 62,593 | 504,579 | 25,71,634 |
| 1,350,548 | ... | ... | ... | ... | 2,930,689 | 1,04,03,140 | 49,705 | 1,48,029 | 2,980,394 | 1,05,51,169 |
| 10,381 | 15,259 | 52,769 | 170,969 | 3,69,399 | 145,818 | 3,23,500 | 40,410 | 98,668 | 186,228 | 4,22,168 |
| 6,684,278 | ... | ... | ... | ... | 19,605,868 | 8,27,39,212 | 1,282,570 | 39,77,994 | 20,888,438 | 8,67,17,206 |

Basti, where new forms of mauza registers have been introduced columns 11 to 14 include cash-rented, land only. In all other districts they include columns 11, 13 and 12, 14.
been repeated.

*Statement showing classification of holdings and rental statistics for 1309 fasli of the Agra Province*—(concld.).

| Dirtrict. | Rental statistics. | | Collections | | | Percentage of total collection to demand. | Corrected rent-roll. |
|---|---|---|---|---|---|---|---|
| | Siwái demand. | Total demand. | For present year. | For previous years. | Total collection. | | |
| 1 | 21 | 22 | 23 | 24 | 25 | 26 | 27 |
| | Rs. | Rs. | Rs. | Rs. | Rs. | Rs. | Rs. |
| Dehra Dún ... ... | 1,19,579 | 3,65,797 | 3,25,222 | 13,960 | 3,39,182 | 93 | 5,25,445 |
| Saháranpur ... ... | 24,776 | 27,55,703 | 20,22,158 | 4,56,008 | 24,78,166 | 90 | 45,12,605 |
| Muzaffarnagar ... ... | 50,400 | 29,86,174 | 23,28,761 | 3,92,011 | 27,20,772 | 91 | 44,83,486 |
| Meerut ... ... | 1,45,032 | 44,52,677 | 30,37,442 | 6,79,133 | 37,16,575 | 83 | 80,96,771 |
| Bulandshahr ... ... | 1,12,501 | 46,53,561 | 35,68,677 | 5,34,476 | 41,03,153 | 88 | 57,99,174 |
| Aligarh* ... ... | 62,988 | 46,81,944 | 38,11,848 | 4,90,651 | 43,02,499 | 92 | 56,41,315 |
| Total ... | 5,15,276 | 1,98,95,656 | 1,50,94,108 | 25,66,239 | 1,76,60,347 | 89 | 2,90,58,796 |
| Muttra ... ... ... | 34,242 | 26,98,186 | 17,85,883 | 2,91,472 | 20,77,355 | 77 | 37,85,510 |
| Agra... ... ... ... | 29,442 | 33,16,463 | 23,81,408 | 5,87,183 | 29,68,591 | 89 | 40,66,961 |
| Farrukhabad* ... ... | 23,051 | 21,46,889 | 12,24,961 | 4,72,071 | 16,97,032 | 79 | 26,59,672 |
| Mainpuri* ... ... | 22,196 | 24,31,416 | 17,33,117 | 5,24,103 | 22,57,220 | 93 | 29,50,887 |
| Etáwah ... ... | 31,782 | 25,63,118 | 20,21,830 | 3,90,737 | 24,12,567 | 94 | 30,75,882 |
| Etah* ... ... ... | 43,153 | 23,82,910 | 16,33,651 | 5,12,873 | 21,46,524 | 90 | 28,61,567 |
| Total ... | 1,83,866 | 1,55,38,982 | 1,07,80,850 | 27,78,439 | 1,35,59,289 | 87 | 1,94,00,479 |
| Bareilly† ... ... | 1,14,213 | 34,29,204 | 27,81,813 | 3,91,250 | 31,73,063 | 93 | 37,17,908 |
| Bijnor† ... ... | 36,963 | 30,63,413 | 21,33,880 | 5,51,740 | 26,85,620 | 88 | 38,23,309 |
| Budaun ... ... | 23,635 | 29,67,694 | 23,25,264 | 4,60,810 | 27,86,074 | 94 | 35,37,489 |
| Moradabad ... ... | 82,631 | 40,57,933 | 32,27,409 | 5,66,278 | 37,93,687 | 93 | 45,71,808 |
| Sháhjahánpur* ... ... | 78,146 | 23,64,469 | 16,11,714 | 4,15,652 | 20,27,366 | 86 | 27,58,466 |
| Pilibhít* ... ... | 73,773 | 14,84,054 | 10,18,552 | 2,50,434 | 12,68,986 | 86 | 15,77,548 |
| Total ... | 4,09,361 | 1,73,66,767 | 1,30,98,632 | 26,36,164 | 1,57,34,796 | 91 | 1,99,86,528 |
| Cawnpore ... ... | 62,007 | 38,42,672 | 29,61,432 | 5,04,418 | 34,65,850 | 90 | 45,19,404 |
| Fatehpur ... ... | 65,116 | 22,86,327 | 19,02,823 | 2,17,782 | 21,20,605 | 92 | 27,08,585 |
| Bánda ... ... | 67,390 | 16,74,325 | 13,79,117 | 1,16,265 | 14,95,382 | 89 | 24,06,401 |
| Hamírpur ... ... | 20,832 | 13,11,071 | 11,09,058 | 61,218 | 11,70,276 | 89 | 19,19,718 |
| Allahabad ... ... | 42,836 | 43,34,510 | 29,67,371 | 8,39,704 | 38,07,075 | 88 | 52,83,767 |
| Jhánsi... ... ... | 24,920 | 9,05,750 | 7,66,315 | 32,028 | 7,98,343 | 88 | 13,78,831 |
| Jalaun* ... ... | 11,882 | 12,54,319 | 10,08,476 | 1,50,711 | 11,59,187 | 92 | 18,85,265 |
| Total ... | 2,94,983 | 1,56,08,974 | 1,20,94,592 | 19,22,126 | 1,40,16,718 | 90 | 2,01,01,971 |
| Benares ... ... | 8,003 | 14,55,095 | 5,74,163 | 3,95,158 | 9,69,321 | 67 | 19,16,462 |
| Mirzapur ... ... | 22,805 | 14,57,912 | 8,06,014 | 3,45,303 | 11,51,317 | 79 | 20,09,761 |
| Jaunpur ... ... | 5,016 | 23,49,201 | 13,00,254 | 5,02,425 | 18,02,679 | 77 | 29,48,742 |
| Gházipur ... ... | 11,391 | 18,81,904 | 9,12,379 | 4,78,596 | 13,90,975 | 74 | 28,32,069 |
| Ballia ... ... | 16,821 | 16,56,900 | 8,32,455 | 3,29,212 | 11,61,667 | 70 | 23,95,823 |
| Total ... | 64,036 | 88,01,012 | 44,25,265 | 20,50,694 | 64,75,959 | 74 | 1,21,02,857 |
| Gorakhpur ... ... | 1,92,121 | 47,58,299 | 42,95,297 | 2,08,797 | 45,04,094 | 95 | 63,73,973 |
| Basti ... ... | 44,553 | 34,57,910 | 33,54,383 | 40,161 | 33,94,544 | 98 | 51,38,588 |
| Azamgarh* ... ... | 15,491 | 25,87,125 | 21,72,940 | 2,93,886 | 24,66,826 | 95 | 44,41,937 |
| Total ... | 2,52,165 | 1,08,03,334 | 98,22,620 | 5,42,844 | 1,03,65,464 | 96 | 1,59,54,498 |
| Naini Tal (Tarái parganas only) | 19,485 | 4,41,653 | 4,12,212 | 20,556 | 4,32,768 | 91 | 4,64,686 |
| Total Agra Province ... | 17,39,172 | 8,84,56,378 | 6,57,28,279 | 1,25,17,062 | 7,82,45,541 | 88 | 11,70,69,815 |

* Figures for 1901-1902 have not been received owing to survey or settlement operations being in progress: hence figures for 1900 1901 have been repeated.

† Figures for only a portion of the district are for 1900-1902; those for the remaining portions have been taken from previous years' returns.

*Statement showing classification of holdings and rental statistics for* 1308 *fasli for Oudh.*

| District. | Area of holdings. | | | | | | | Uncultivated land included in holdings. | Rent-free and nominally-rented area, columns 2 to 4 |
|---|---|---|---|---|---|---|---|---|---|
| | Sír. | Held by zamíndárs other than sír. | Held without rent. | Held by under-proprietors with under-proprietary rights. | Held by occupancy tenants with occupancy rights. | Held by ordinary tenants. | Total area of holdings, columns 2 to 7. | | |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| | Acres. | Acres. | Acres. | Acres. | Acres. | Acres. | Acres. | Acres. | Acres. |
| Lucknow ... | 12,531 | 23,800 | 12,864 | 19,214 | 4,587 | 304,943 | 377,939 | 15,091 | 49,195 |
| Unao ... | 55,955 | 34,864 | 37,160 | 16,663 | 4,841 | 509,500 | 658,983 | 28,177 | 127,979 |
| Rae Bareli ... | 25,711 | 19,435 | 16,904 | 46,147 | 10,365 | 511,338 | 629,900 | 40,209 | 62,050 |
| Sítapur ... | 22,162 | 48,570 | 57,737 | 4,281 | 3,000 | 911,195 | 1,046,945 | 38,290 | 128,469 |
| Hardoi* ... | 107,798 | 78,566 | 31,604 | 15,697 | 6,290 | 706,312 | 946,267 | 39,315 | 217,968 |
| Kheri ... | 21,141 | 27,825 | 66,093 | 10,599 | 10,082 | 745,566 | 881,306 | 50,877 | 115,059 |
| Total ... | 245,298 | 235,060 | 222,362 | 112,601 | 39,165 | 3,688,854 | 4,541,340 | 211,959 | 700,720 |
| Fyzabad ... | 51,675 | 49,680 | 32,912 | 91,622 | 20,625 | 478,278 | 724,792 | 37,711 | 134,267 |
| Gonda† ... | 46,100 | 237,364 | 25,401 | 58,568 | 12,819 | 805,196 | 1,185,448 | 106,907 | 308,865 |
| Bahraich ... | 5,038 | 47,345 | 8,911 | 9,323 | 1,395 | 941,806 | 1,013,818 | 58,244 | 61,294 |
| Sultánpur ... | 53,628 | 52,991 | 12,332 | 59,986 | 14,615 | 458,780 | 652,332 | 21,184 | 118,951 |
| Partábgarh ... | 28,522 | 30,628 | 23,661 | 33,591 | 23,008 | 401,951 | 541,361 | 26,710 | 82,811 |
| Bara Banki ... | 46,072 | 26,203 | 28,576 | 25,121 | 6,479 | 639,463 | 771,914 | 25,256 | 100,851 |
| Total ... | 231,035 | 444,211 | 131,793 | 278,211 | 78,941 | 3,725,474 | 4,889,665 | 276,012 | 807,039 |
| Total, Oudh ... | 476,333 | 677,271 | 354,155 | 390,812 | 118,106 | 7,414,328 | 9,431,005 | 487,971 | 1,507,759 |

* Figures for only a portion of the district are for 1900-1901; those for the remaining portions have been taken from previous years' returns.

† Figures for 1900-1901 have not been received owing to settlement operations being in progress: hence figures for 1899-1900 have been repeated.

*Statement showing classification of holdings and rental statistics for* 1309 *fasli for Oudh.*

| District. | Area of holdings. | | | | | | | Uncultivated land included in holdings. | Rent-free and nominally-rented area, columns 2 to 4. |
|---|---|---|---|---|---|---|---|---|---|
| | Sír. | Held by zamíndárs other than sír. | Held without rent. | Held by under-proprietors with under-proprietary rights. | Held by occupancy tenants with occupancy rights. | Held by ordinary tenants. | Total area of holdings, columns 2 to 7. | | |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| | Acres. | Acres. | Acres. | Acres. | Acres. | Acres. | Acres. | Acres. | Acres. |
| Lucknow ... | 12,517 | 23,653 | 22,245 | 13,254 | 4,279 | 309,123 | 385,071 | 15,422 | 58,415 |
| Unao ... | 55,858 | 35,224 | 46,097 | 13,982 | 4,688 | 518,003 | 673,852 | 25,465 | 137,179 |
| Rae Bareli ... | 25,917 | 19,442 | 16,793 | 46,099 | 10,447 | 519,920 | 638,618 | 41,500 | 62,152 |
| Sítapur ... | 22,262 | 49,391 | 54,839 | 4,002 | 2,989 | 933,853 | 1,067,336 | 38,696 | 126,492 |
| Hardoi* ... | 107,798 | 78,566 | 31,604 | 15,697 | 6,290 | 706,312 | 946,267 | 39,315 | 217,968 |
| Kheri ... | 20,856 | 28,091 | 62,522 | 10,842 | 10,955 | 779,687 | 912,953 | 53,587 | 111,469 |
| Total ... | 245,208 | 234,367 | 234,100 | 103,876 | 39,648 | 3,766,898 | 4,624,097 | 213,985 | 713,675 |
| Fyzabad ... | 51,366 | 49,751 | 35,826 | 90,916 | 20,600 | 483,675 | 732,134 | 40,680 | 136,943 |
| Gonda† ... | 46,134 | 238,654 | 24,560 | 58,463 | 12,436 | 813,524 | 1,193,771 | 87,327 | 309,348 |
| Bahraich ... | 5,331 | 48,244 | 9,219 | 9,362 | 1,867 | 960,118 | 1,034,141 | 59,563 | 62,794 |
| Sultánpur ... | 53,736 | 52,696 | 12,262 | 60,415 | 14,697 | 460,864 | 654,670 | 27,180 | 118,694 |
| Partábgarh ... | 28,476 | 30,206 | 23,885 | 33,751 | 23,376 | 405,735 | 545,429 | 32,740 | 82,567 |
| Bara Banki ... | 46,209 | 26,007 | 24,639 | 24,861 | 6,519 | 657,083 | 785,318 | 24,558 | 96,855 |
| Total ... | 231,252 | 445,558 | 130,391 | 277,768 | 79,495 | 3,780,999 | 4,945,463 | 272,048 | 807,201 |
| Total, Oudh ... | 476,460 | 679,925 | 364,491 | 381,644 | 119,143 | 7,547,897 | 9,569,560 | 486,033 | 1,520,876 |

* Figures for 1901-1902 have not been received owing to settlement operations being in progress: hence figures for 1900-1901 have been repeated.

† Figures for only a portion of the district are for 1901-1902; those for the remaining portions have been taken from previous years' returns.

*Statement showing classification of holdings*

| District. | Rental | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Cash-rented land.* | | | | | | Grain-rented land. | |
| | Under-proprietors and occupancy tenants. | | Ordinary tenants. | | Total. | | Area. | Rent. |
| | Area. | Rent. | Area. | Rent. | Area. | Rent. | | |
| 1 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 |
| | Acres. | Rs. | Acres. | Rs. | Acres. | Rs. | Acres. | Rs. |
| Lucknow ... | 23,715 | 60,466 | 283,812 | 19,01,337 | 307,527 | 19,61,803 | 21,217 | 1,03,488 |
| Unao ... | 21,504 | 67,471 | 501,133 | 28,12,205 | 522 637 | 28,79,676 | 8,367 | 46,556 |
| Rae Bareli ... | 56,512 | 1,44,374 | 488,267 | 30,18,620 | 544,779 | 31,62,994 | 23,071 | 74,869 |
| Sítapur ... | 5,682 | 12,587 | 462,590 | 28,43,651 | 468,272 | 28,56,238 | 450,204 | 23,16,668 |
| Hardoi† ... | 21,987 | 48,170 | 636,488 | 30,05,369 | 658,475 | 30,53,539 | 69,824 | 3,16,719 |
| Kheri ... | 19,851 | 34,869 | 463,411 | 17,22,908 | 483,262 | 17,57,777 | 282,985 | 12,67,039 |
| Total ... | ... | ... | ... | ... | 2,984,952 | 1,56,72,027 | 855,668 | 41,25,339 |
| Fyzabad ... | 112,247 | 3,21,945 | 466,928 | 25,38,233 | 579,075 | 28,60,178 | 11,450 | 16,933 |
| Gonda‡ ... | 71,387 | 1,40,191 | 805,196 | 32,76,020 | 651,411 | 27,03,171 | 225,172 | 7,13,040 |
| Bahraich ... | 10,718 | 13,749 | 566,555 | 25,16,508 | 577,273 | 25,30,257 | 375,251 | 16,94,525 |
| Sultánpur ... | 74,601 | 1,93,191 | 444,610 | 26,04,245 | 519,211 | 27,97,436 | 14,170 | 40,784 |
| Partábgarh ... | 56,599 | 1,73,532 | 393,983 | 25,56,289 | 450,582 | 27,29,821 | 7,968 | 27,023 |
| Bara Banki ... | 31,600 | 83,942 | 611,377 | 43,45,286 | 642,977 | 44,29,228 | 28,086 | 89,728 |
| Total ... | ... | ... | ... | ... | 3,420,529 | 1,80,50,091 | 662,097 | 25,82,033 |
| Total, Oudh ... | ... | ... | ... | ... | 6,405,481 | 3,37,22,118 | 1,517,765 | 67,07,372 |

* In all the districts except Gonda, where new forms of mauza registers have been

cash-rented and grain-rented land. Columns 15 and 16 show for all districts

† Figures for only a portion of the district are for 1900-1901; those for the

‡ Figures for 1900-1901 have not been received owing to settlement operations

*Statement showing classification of holdings*

| Districts. | Rental | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Cash-rented land.* | | | | | | Grain-rented land. | |
| | Under-proprietors and occupancy tenants. | | Ordinary tenants. | | Total. | | Area. | Rent. |
| | Area. | Rent. | Area. | Rent. | Area. | Rent. | | |
| 1 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 |
| | Acres. | Rs. | Acres. | Rs. | Acres. | Rs. | Acres. | Rs. |
| Lucknow ... | 17,447 | 60,234 | 287,594 | 19,65,810 | 305,041 | 20,26,044 | 21,615 | 86,730 |
| Unao ... | 18,670 | 67,718 | 508,183 | 28,88,689 | 526,853 | 29,56,407 | 9,820 | 48,182 |
| Rae Bareli ... | 56,546 | 1,44,816 | 497,130 | 31,02,797 | 553,676 | 32,47,613 | 22,790 | 58,026 |
| Sítapur ... | 5,763 | 13,331 | 477,359 | 29,54,056 | 483,122 | 29,67,387 | 457,722 | 20,67,893 |
| Hardoi† ... | 21,987 | 48,170 | 636,488 | 30,05,369 | 658,475 | 30,53,539 | 69,824 | 3,16,719 |
| Kheri ... | 21,261 | 37,908 | 490,538 | 19,45,021 | 511,799 | 19,82,929 | 289,685 | 10,40,153 |
| Total ... | ... | ... | ... | ... | 3,038,966 | 1,62,33,919 | 871,456 | 36,17,703 |
| Fyzabad ... | 111,516 | 3,26,303 | 472,378 | 25,92,519 | 583,894 | 29,18,822 | 11,297 | 13,006 |
| Gonda‡ ... | ... | ... | ... | ... | 661,323 | 27,61,462 | 223,100 | 7,15,583 |
| Bahraich ... | 11,229 | 14,379 | 578,621 | 26,09,081 | 589,850 | 26,23,460 | 381,497 | 17,19,292 |
| Sultánpur ... | 75,112 | 1,96,095 | 446,282 | 26,55,896 | 521,394 | 28,51,991 | 14,582 | 31,309 |
| Partábgarh ... | 57,029 | 1,74,217 | 398,124 | 26,05,068 | 455,153 | 27,79,285 | 7,709 | 22,521 |
| Bara Banki ... | 31,369 | 83,536 | 627,904 | 44,68,169 | 659,273 | 45,51,705 | 29,190 | 84,471 |
| Total ... | ... | ... | ... | ... | 3,470,887 | 1,84,86,725 | 667,375 | 25,86,187 |
| Total, Oudh ... | ... | ... | ... | ... | 6,509,853 | 3,47,20,644 | 1,538,831 | 62,03,890 |

* In all the districts except Gonda, where new forms of mauza registers have been

cash-rented and grain-rented land. Columns 15 and 16 show for all districts

†Figures for 1901-1902 have not been received owing to settlement operations

‡Figures for a portion of the district are for 1901-1902; those for the

*and rental statistics for* 1308 *fasli for Oudh*—(concluded).

| statistics. | | | | Collections. | | | | |
|---|---|---|---|---|---|---|---|---|
| Total cash and grain-rented land. | | Sewai demand. | Total demand. | For current year. | For previous years. | Total collection. | Percentage of total collection to demand. | Corrected rent-roll. |
| Area. | Rent. | | | | | | | |
| 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 |
| Acres. | Rs. | Rs. | Rs. | Rs. | Rs. | Rs. | | Rs. |
| 328,744 | 20,65,291 | 44,279 | 21,09,570 | 18,43,245 | 2,56,903 | 21,00,148 | 100 | 24,23,444 |
| 531,004 | 29,26,232 | 54,993 | 29,81,225 | 26,34,223 | 3,14,249 | 29,48,472 | 99 | 36,86,443 |
| 567,850 | 32,37,863 | 1,38,532 | 35,76,395 | 30,61,560 | 3,88,286 | 34,49,846 | 102 | 37,36,737 |
| 918,476 | 51,72,906 | 1,49,663 | 53,22,569 | 48,05,327 | 3,20,808 | 51,26,135 | 96 | 61,06,096 |
| 728,299 | 33,70,258 | 40,848 | 34,11,106 | 29,38,928 | 3,44,501 | 32,83,429 | 96 | 44,21,478 |
| 766,247 | 30,24,816 | 1,78,117 | 32,02,933 | 26,49,898 | 3,66,847 | 30,16,745 | 94 | 36,21,220 |
| 3,840,620 | 1,97,97,366 | 6,06,432 | 2,04,03,798 | 1,79,33,181 | 19,91,594 | 1,99,24,775 | 98 | 2,39,95,418 |
| 590,525 | 28,77,111 | 52,969 | 29,30,080 | 24,62,912 | 3,16,914 | 27,79,826 | 95 | 35,93,023 |
| 876,583 | 34,16,211 | 1,50,779 | 35,66,990 | 29,32,705 | 3,72,704 | 33,05,409 | 93 | 48,49,101 |
| 952,524 | 42,24,782 | 1,77,681 | 44,02,463 | 37,80,069 | 3,50,560 | 41,30,629 | 94 | 46,71,263 |
| 533,381 | 28,38,220 | 36,229 | 28,74,449 | 24,00,818 | 3,43,747 | 27,44,565 | 95 | 35,15,950 |
| 458,550 | 27,56,844 | 43,910 | 28,00,754 | 23,73,936 | 4,39,331 | 28,13,267 | 100 | 33,02,364 |
| 671,063 | 45,18,956 | 65,660 | 45,84,616 | 42,54,171 | 2,38,923 | 44,93,094 | 98 | 52,79,542 |
| 4,082,626 | 2,06,32,124 | 5,27,228 | 2,11,59,352 | 1,82,04,611 | 20,62,179 | 2,02,66,790 | 96 | 2,52,10,343 |
| 7,923,246 | 4,04,29,490 | 11,33,660 | 4,15,63,150 | 3,61,37,792 | 40,53,773 | 4,01,91,565 | 97 | 4,92,05,761 |

introduced, columns 11 –14 include cash-rented land only. In Gonda they include
cash-rented land only and consequently are not the sum of columns 11, 13 and 12, 14.
remaining portions have been taken from previous years' returns.
being in progress; hence figures for 1899-1900 have been repeated.

*and rental statistics for* 1309 *fasli for Oudh*—(concluded).

| statistics. | | | | Collections. | | | | |
|---|---|---|---|---|---|---|---|---|
| Total cash and grain-rented land. | | Sewai demand. | Total demand. | For current year. | For previous years. | Total collection. | Percentage of total collection to demand. | Corrected rent-roll. |
| Area. | Rent. | | | | | | | |
| 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 |
| Acres. | Rs. | Rs. | Rs. | Rs. | Rs. | Rs. | | Rs. |
| 326,656 | 21,12,774 | 88,117 | 22,00,891 | 19,36 787 | 2,06,853 | 21,43,640 | 97 | 25,88,803 |
| 536,673 | 30,04,589 | 58,652 | 30,63,241 | 27,44,165 | 2,56,906 | 30,01,071 | 98 | 38,32,729 |
| 576,466 | 33,05,639 | 1,28,470 | 34,34,109 | 30,54,378 | 2,84,822 | 33,39,200 | 97 | 37,98,605 |
| 940,844 | 50,35,280 | 1,57,850 | 51,93,130 | 46,30,949 | 3,26,484 | 49,57,433 | 95 | 59,69,870 |
| 728,299 | 33,70,258 | 40,848 | 34,11,106 | 29,38,928 | 3,44,501 | 32,83,429 | 96 | 44,21,478 |
| 801,484 | 30,23,082 | 2,04,065 | 32,27,147 | 24,77,538 | 4,19,120 | 28,96,658 | 90 | 36,59,089 |
| 3,910,422 | 1,96,51,622 | 6,78,002 | 2,05,29,624 | 1,77,82,745 | 18,38,686 | 1,96,21,431 | 96 | 2,42,70,574 |
| 595,191 | 29,31,828 | 64,161 | 29,95,989 | 24,99,592 | 2,94,842 | 27,94,434 | 93 | 36,80,704 |
| 884,423 | 34,77,050 | 1,49,267 | 36,26,317 | 30,88,425 | 2,78,404 | 33,66,829 | 93 | 49,18,489 |
| 971,347 | 43,42,752 | 2,01,577 | 45,44,329 | 38,73,401 | 3,34,167 | 42,07,568 | 93 | 48,23,631 |
| 535,976 | 28,83,300 | 37,055 | 29,20,355 | 24,13,447 | 2,80,324 | 26,93,771 | 92 | 35,69,463 |
| 462,862 | 28,01,806 | 40,644 | 28,42,450 | 23,88,976 | 3,12,119 | 27,01,095 | 95 | 33,46,453 |
| 688,463 | 46,36,176 | 78,867 | 47,15,043 | 42,84,654 | 2,34,298 | 45,18,952 | 96 | 53,83,948 |
| 4,138,262 | 2,10,72,912 | 5,71,571 | 2,16,44,483 | 1,85,48,495 | 17,34,154 | 2,02,82,649 | 94 | 2,57,22,688 |
| 8,048,684 | 4,09,24,534 | 12,49,573 | 4,21,74,107 | 3,63,31,240 | 35,72,840 | 3,99,04,080 | 95 | 4,99,93,262 |

introduced, columns 11—14 include cash-rented land only. In Gonda they include
cash-rented land only, and consequently are not the sum of columns 11, 13 and 12, 14.
being in progress, hence figures for 1900-1901 have been repeated.
remaining portions have been taken from previous years' returns.

# ORDERS OF GOVERNMENT.

No. $\frac{1158}{I-568G}$ OF 1903.

## RESOLUTION.

REVENUE DEPARTMENT.

*Dated Allahabad, the 31st March* 1903.

READ—

Letter No. $\frac{608}{VIII-486}$, dated 30th January 1903, from the Director of Land Records and Agriculture, United Provinces, being his report on the operations of the Department of Land Records and Agriculture for the year ending 30th September 1902.

Letter No. $\frac{39}{VII-47}$, dated 7th March 1903, from the Board of Revenue, United Provinces, forwarding the report with remarks.

OBSERVATIONS.—The report, which is in the improved form, contains, in addition to the account of the land record operations of the year, interesting particulars of the useful and multifarious work undertaken by the Department under the head of agriculture. In nearly all branches there has been progress, leading to a substantial development of the duties and responsibilities of the Director. The Board of Revenue report that they have suitably dealt with the defects of procedure in certain districts noted by the Director, and the Government trusts that the rules and instructions relating to the punctual filing of patwáris' papers, their testing by superior officers, the preparation of more accurate rent-rolls, the examination of pargana books, and the reports of deterioration may be more carefully observed in future. The recent simplification of rules in the new edition of the Manual and the curtailment of returns will, it is hoped, tend to greater efficiency. On the question of promotion of kánúngos to the post of náib tahsíldárs, five permanent appointments should annually be given to kánúngos. A larger measure of promotion cannot be promised.

2. Excluding Etáwah, the survey of which has been postponed, survey operations continued in four districts, the cost averaging Rs. 71¼ per square mile. The date of commencement of survey operations in each district should in future be stated, as required by paragraph 6 of the letter of the Government of India, Department of Revenue and Agriculture, No. 2099—321-14, dated the 26th September 1901. The Government is glad to see from the return of rental statistics that there was a substantial advance in the cultivated area in both Provinces.

3. The Director's action in gauging the result of arboricultural operations by the number of roadside trees successfully established after several years' growth is a reform which is cordially approved and which may, it is hoped, have an appreciable effect upon the work.

4. The Department deserves much credit for the development on sound lines of the system under which really good seed is advanced to cultivators, to be returned by them with interest at harvest time. To have any chance of success, the business must obviously be conducted

with much care, energy, and attention to details. An unscrupulous agent, inattentive to the wants and wishes of his customers, would ruin the experiment at once. The system, if it takes root, seems capable of boundless expansion by private enterprise of a reliable character.

5. A certain amount of work was done during the year in connection with boring for wells; but this branch, which evidently meets a real want, is still in its infancy, and will require to be largely strengthened in the near future.

6. The acknowledgments of the Government are due to Mr. Moreland for his efficient administration of the Department during the year.

---

ORDER.—Ordered that a copy of the above Resolution be forwarded to the Director of Land Records and Agriculture, United Provinces, for information.

Ordered also that a copy be forwarded to the Secretary to the Board of Revenue, United Provinces, for the information of the Board.

W. H. L. IMPEY,

*Chief to Secy. Govt., United Provinces.*

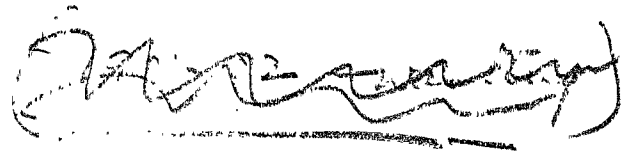
# REPORT

ON THE

# Operations of the Dept. of Land Records & Agriculture,

## UNITED PROVINCES OF AGRA AND OUDH,

FOR THE YEAR ENDING 30th SEPTEMBER 1903.



*ALLAHABAD:*

Printed at the United Provinces Government Press.

*1904.*

[Prescribed maximum limit of the report 25 pages, excluding tabular statements.]

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# REPORT

ON THE

# Operations of the Department of Land Records and Agriculture,

## UNITED PROVINCES,

***FOR THE YEAR ENDING THE 30TH SEPTEMBER 1903.***

No. $\frac{947}{\text{VIII}-530}$.

FROM

W. H. MORELAND, ESQ.,
DIRECTOR, DEPARTMENT OF LAND RECORDS AND AGRICULTURE,
UNITED PROVINCES,

To

THE CHIEF SECRETARY TO GOVERNMENT,
UNITED PROVINCES,
REVENUE DEPARTMENT.

*Dated Lucknow, the 16th January* 1904.

SIR,

I HAVE the honour to submit the annual report on the work of this department for the year ending the 30th September 1903.

## CHAPTER I.

### PREFATORY.

Charge of the department.

2. I continued to hold charge of the department up to 10th December 1902, on which date I proceeded on leave. The Assistant Director then held charge of the department till 19th December, when he was relieved by Mr. S. H. Butler, C.I.E. Mr. Butler officiated till 7th April, when Mr. F. J. Pert relieved him. I returned from leave on 13th July, and held charge for the remainder of the year.

The post of Deputy Director was held by Mr. J. M. Hayman till 22nd July 1903, when he proceeded on leave, his work being carried on during his absence by the other officers of the department. Saiyid Muhammad Hadi, M.R.A.C., M.R.A.S., held the post of the Assistant Director throughout the year, and Captain W. M. Coldstream, R.E., that of Superintendent of provincial surveys.

Tours of officers.

3. In November I spent some days in instructing the Assistant Collectors deputed for land records duty, and inspected the land records in Bulandshahr, and the *úsar* experiment station in Aligarh. The end of the month and the early part of December were occupied in clearing off pending cases before going on leave, and in collecting information, and appearing as a witness before the Irrigation Commission. Mr. Butler inspected portions of the land records work of Aligarh, Lucknow, Rae Bareli and Gházipur. He also visited Moradabad in connection with the settlement forecast, and Saháranpur to inspect the botanical gardens. During July and August I inspected land records work in Bánda, Allahabad, Mirzapur, Gházipur, Jaunpur, Fyzabad, Basti, Gonda, Bahraich, Hardoi and Sháhjahánpur.

4. The Deputy Director spent part of the cold weather on tour in Bundelkhand continuing his examination of the system of agriculture in general and of the cattle in particular. The rest of his time was spent mainly in his investigations at Cawnpore; an account of these is given in the report on the Cawnpore Farm and they need not be recapitulated here. Mr. Hayman also attended the cattle-shows at Karma, Karwi and Gonda; examined the agricultural class at the Moradabad normal school, and visited Orai to attend to the experimental work in progress at that place.

5. During the months of October and November the Assistant Director was engaged in the collection and distribution of seed. During December he attended the Bahraich cattle-show, arranged for further purchases of seed, and was engaged in supervising the Abbaspur plantation. From January to April he was engaged principally in experiments and demonstrations connected with the manufacture of sugar, but he also attended the Kheri cattle-show and the Sultánpur agricultural show, and examined the agricultural class at the Moradabad normal school. The seed depôts again required his attention from the latter part of April until the end of July ; the rest of the year was spent mainly at Cawnpore.

6. During the field season the Superintendent of provincial surveys, besides conducting a survey class for junior civilians in December, inspected the survey offices at Mainpuri, Jalaun, Azamgarh and Fyzabad and the traverse office at Aligarh ; he also checked the survey work in the field in Mainpuri and Jalaun and the town surveys in Koel and Háthras, and examined and checked the village maps of Lalitpur. During the rainy season, he inspected all survey offices and visited Bánda, Hamírpur and Moradabad to make arrangements for the work of the coming season.

Special features of the year's work.

7. The only important development to note on the land records side of the department is the deputation of Assistant Collectors to districts where the standard of work is low ; three districts were taken up during the year under report and four more during the current year. On the agricultural side may be mentioned the inception of experimental work in Bundelkhand, undertaken in accordance with the suggestions of the President of the Irrigation Commission, and the decision of the Government of India that an agricultural college should not be started at present in these provinces. As soon as the college at Pusa is opened, it is intended to bring the agricultural school into close connection with it by means of scholarships and otherwise so that the best of the Cawnpore students may have facilities for passing on to more advanced study.

## CHAPTER II.

### (I) Land Records.

Establishment.

8. There have been few changes in the staff during the year under report. One assistant registrar kanúngo and two apprentice kanúngos were sanctioned for Basti and Allahabad respectively, a teacher was added to the patwári school establishment in Pilibhít, and an assistant teacher reduced in Basti. The number of patwáris in Agra rose by 13 and that in Oudh fell by 12, the decrease in the latter case being mainly due to the general reallocation of circles in Gonda.

9. Proposals were submitted during the year to utilize a portion of the surplus income of the patwári fund in (1) increasing the staff of supervisors where required ; (2) setting free the sadr kanúngos for inspection work by giving them an indoor staff competent to manage their office during their absence ; and (3) grading the sadr kanúngos so as to give a chance of promotion to those officials who maintain an effective supervision over the work of the land records staff. These proposals await the orders of Government.

Revision of circles.

10. The sanction to the proposals for the outstanding tahsíl in the Gonda district received during the year completed the revision of patwáris' circles in Oudh. The total extra cost for the province amounts to Rs. 43,746. In Agra schemes for Meerut and Bareilly have been submitted, while those for Aligarh, Bijnor, Sháhjahánpur, Farukhabad and Etáwah are under examination.

Promotion of kanúngos.

11. During the year one sadr kanúngo was appointed sub. *pro tem.* tahsíldár, while eleven kanúngos received temporary promotion as naib tahsíldárs and two were made permanent in the same post. Three kanúngos were selected as approved candidates for naib tahsíldárship, one of them being exempted from the prescribed examinational qualification.

Promotion of patwáris.

12. Fifteen patwáris received permanent promotion to higher appointments and seven were exempted from the educational test during the year as compared with nine and four respectively in the year preceding.

13. The proportion of passed patwáris continues to improve. Out of 28,844 patwáris and assistants in the United Provinces (excluding Almora and Garhwál) 26,075, or 90·4 per cent., have now passed through the school course as compared with 89·9 per cent. in the preceding year. The number of patwáris exempted fell from 1,984 to 1,745 and that of unpassed men rose from 931 to 1,024. The latter figure includes 404 heirs conditionally appointed in accordance with the rules, and 406 circles vacant at the close of the year. Of the rest 156 men are attending a patwári school, and only 58 have still to begin their special training. The old patwáris who were exempted from training when the department was organized are now rapidly disappearing; no new exemptions are recognised by the rules, and in two cases where the number of exemptions reported shows an increase an explanation has been called for.

Education of patwáris.

14. Much difficulty has been found in securing text-books in arithmetic and mensuration suitable for these schools. I had all the text-books that were recommended examined by a small departmental committee meeting under the Superintendent of provincial surveys, and as no book was found suitable, I have made arrangements for one to be prepared in accordance with a syllabus drawn up by Captain Coldstream and myself. Five good conduct allowances were awarded to efficient patwári teachers of long service and I intend granting further allowances to other deserving men after inspection of their work. The chief difficulty in the management of these schools is the maintenance of a sufficiently high standard of training in survey and map work. The teachers have all received training at a survey party, and know their business, but it is difficult to keep them up to the mark; I am about to try the experiment of employing on my inspection staff a first class professional surveyor who will inspect this branch of the work and nothing else, visiting each school once a year.

15. The subject of residence has on the whole received sufficient attention in most districts; accurate information is not easy to collect and the first sign of improvement in administration is usually a fall in the number of residents reported. Leaving out of account those districts of Agra where reallocations are in progress, 81 per cent. of the patwáris are returned as resident, 10 per cent. as exempted and less than 9 per cent. as absentees without permission. Exemptions have been considerably reduced, which is a good sign, and the general trend of the figures is encouraging, but their statistical value is low and I do not propose to discuss them at length. In Oudh many patwáris have now settled down in their new circles: 70 per cent. are returned as resident, 13 per cent. as exempted and 17 per cent. as absentees.

Residence of patwáris.

16. At the instance of Government district officers were consulted during the year about extending the system of giving building advances to patwáris; proposals on the subject have been submitted and orders are awaited. In connection with the subject of residence I may quote the following remarks made by the Collector of Jhánsi: "I have accorded," he writes, "permission during the year to a large number of patwáris to cultivate in their circles. It keeps them on the spot, and when tenants are scarce, as in this district, is not much open to abuse." I agree with these remarks, which are probably applicable to other districts south of the Jumna where it is sometimes difficult to get patwáris: it is far better to have a patwári in the circle, even if he spends some time in his field, than to have him living at a considerable distance and only coming to work when he chooses. Unfortunately where there is keen competition for land this remedy for absenteeism would be worse than the disease: the rules on the subject were advisedly drawn so as to leave the whole discretion in this matter to the district officer.

17. The records have been filed with creditable punctuality during the year. Ninety-five per cent. of the area statements, 89 per cent. of the crop statements, and 89 per cent. of the statements of holdings and rentals were filed in time against 76 per cent., 79 per cent., and 73 per cent., respectively, in the preceding year. Only 4,179 papers (183 area statements, 3,094 crop statements and 902 statements of holdings and rentals) were more than a month late: of these 4,087 were in six districts where the patwáris were either engaged in, or returned late from, survey or settlement work. Apart from these districts the greatest delays occurred in Bijnor, Budaun, Gházipur,

Filing of patwáris' papers.

Gorakhpur, Kheri, Gonda and Sultánpur. The connection between punctuality and accuracy is well illustrated in this list, as in nearly every one of these districts the records are known to be below the requisite standard of accuracy.

Testing of patwáris' papers by supervisors.

18. Sufficient testing is reported to have been done in almost all districts. The work fell below the prescribed minimum in Moradabad and Fatehpur owing to the deputation of kanúngos for survey training. In Meerut the Collector reports that the work would have been much better if the organization had not been dislocated by the employment of supervisors as plague inspectors and in collecting supplies in connection with the Delhi Darbár and the manœuvres. Kanúngos are I understand no longer employed on plague work and the other interruptions mentioned are fortunately exceptional.

The value of the test varies widely. Work has admittedly been unsatisfactory in Basti and in Budaun, and no doubt in other districts also. Improvement depends firstly on an increase in the staff where it is deficient, for which sanction has already been solicited; and secondly in effective supervision over the kanúngos themselves. Under the rules this supervision should be exercised partly by officers and partly by the sadr kanúngo; I proceed to examine what they have done.

Testing by superior officers.

19. Officers on the headquarters staff have in many districts devoted a fair proportion of their time to testing the accuracy of the records; much improvement is noticeable in this respect in Bulandshahr, Etáwah, Hamírpur and Jaunpur. The returns show that testing was quite inadequate in Budaun, Rae Bareli, Sítápur and Kheri. In the cases of Sítápur and Rae Bareli the Deputy Commissioner writes that some officers omitted to keep a record of their work: no explanation is offered in the Kheri report; while the Collector of Budaun writes that the officers were so much occupied with case work, (much of it due directly to defective records), that they could not find time to supervise the record work; the Collector has put a stop to this method of accumulating work for the future. Inspection was also interfered with by plague in Fyzabad, (and probably elsewhere), and by other official duties in Saháranpur, Lucknow and Moradabad. In Basti the Collector found that the sub-divisional officers could not manage to inspect their charges in the period allowed for camping. The period has now been extended.

20. It is again necessary to report that in many districts where an adequate amount of time was devoted to the records, attention was concentrated on the patwáris to the neglect of the supervisors: I would re-iterate my opinion that the limited time available is far better spent in making a thorough examination of the supervisor's work than in testing unchecked patwáris' papers; but it is the more difficult duty of the two and the tendency to neglect it is still evident. These remarks apply to the districts shown in the margin.*

| | |
|---|---|
| *Muzaffarnagar. | Gházipur. |
| Muttra. | Lucknow. |
| Bijnor. | Hardoi. |
| Moradabad. | Gonda. |
| Allahabad. | Partábgarh. |
| Jhánsi. | Bara Banki. |

21. Tahsíldárs and their naibs have as a rule done an adequate amount of testing in accordance with the rules which require them to work through their tahsíls in a cycle of three years.

22. The concurrent results of the tests conducted independently by sub-divisional officers and tahsíldárs are sufficient to show that the work of the supervisors had been lacking in thoroughness in Saháranpur, Meerut, Etáwah, Budaun, Sháhjahánpur, Bánda, Hamírpur, Allahabad, Gházipur, Gorakhpur, Basti and Unao. It is a safe inference that where the supervisors are slack the records are inaccurate, though the contrary conclusion cannot be drawn with certainty in the case of those districts where slackness on the part of the supervisors has not yet been detected. Of the twelve districts mentioned, Assistant Collectors were deputed to two during last year and to two during the current season: the records are being revised in Bánda and Hamírpur; while steady reform is in progress under Mr. Molony at Gházipur and Mr. Allen at Budaun. Gorakhpur and Allahabad are such unwieldy districts that I almost doubt whether their detailed administration is possible: I am proposing the appointment of a second sadr kanúngo in each of them. Etáwah and Saháranpur will receive my attention during the current year.

23. Sadr kanúngos have, as a rule, done an adequate amount of testing; any deficiencies that have occurred have been pointed out to the district officer. Besides the sadr kanúngos of Muttra, Allahabad, Ballia, Basti and Bara Banki

who were mentioned last year, those of Meerut, Moradabad, Lucknow and Gonda are reported by district officers to have worked well during the year of report. I think I may fairly say that the value of the sadr kanúngo's test (as distinct from the amount), has improved considerably during the last two years; there is no doubt, however, that further improvement is possible in this respect in many districts. The staff of sadr kanúngos is distinctly better than it was; two more were removed during the year on the Director's recommendation, one or two inefficient men have retired, and the great majority are now quite competent to perform their most important duties provided they are kept up to the mark and are relieved from the crushing load of miscellaneous office work which has grown up in many districts. Some part of this burthen is avoidable: every now and then I find obsolete registers being maintained in particular offices, and cumbrous systems of circumlocution probably still survive in places. But when all avoidable reductions have been made, the mass of work will remain. It is in order to deal with it that I have proposed to give sadr kanúngos responsible assistants on reasonable salaries instead of the young men in training or the hopelessly inefficient seniors who alone can be kept in these posts on the present scale of pay. With a competent office sadr kanúngos could be on tour quite as long as is necessary, and if my proposals are sanctioned I shall see that they do not linger at headquarters.

24. Three districts were put in charge of Assistant Collectors last cold weather, Mr. M. Keane being posted to Meerut, Mr. A. C. Holmes to Mirzapur, and Mr. J. C. Nelson to Unao. All three officers did sound and useful work, which will be of permanent value if the district officers see that the staff are not allowed to fall back into the old ways in which they have been disturbed. Bulandshahr, Sháhjahánpur, Basti and Rae Bareli are being taken up during the current year.

Maintenance of boundary marks.

25. The marks were inspected in all districts except a few under settlement or survey, and steps were taken for their repair or replacement by stone pillars where necessary. The marks have not been properly looked after in Budaun, but the subject has now been taken up. In Bánda and Kheri funds have been allotted for repairs to survey marks not situated on the boundaries of villages.

Map correction.

26. Patwáris in Agra are generally reported to have corrected their maps themselves. It is only in tracts where there is fluctuating cultivation or where rivers are constantly changing their courses that a difficulty is experienced. The maps in Allahabad are reported to be now in a much better condition than they were a few years ago, though much remains to be done. In Jhánsi all but 36 village maps were reported to be up to date, though the Collector doubts if the actual facts were so good as would seem from these figures. In Basti about 25 per cent. of the maps of villages not lying on the lines of roads or near the encamping grounds are reported to be in a very backward condition and necessary orders have been issued by the Collector. He is, however, very doubtful whether the maps of the *halbandi* villages of Domariaganj are ever likely to be kept up to date without a system of continual resurveying, the expense of which would hardly be justifiable by results. These *halbandi* villages were surveyed as recently as 1898-99 and the question of maintaining the maps in them is engaging my attention. The alluvial tracts of Ballia will be visited by the Superintendent of provincial surveys this cold weather to see what can be done to keep the maps up to date; the difficulty in this district arises from the enormous annual deposit of silt, which completely obliterates the field boundaries of the preceding year, and we hope to devise some system of marks on the high river bank which will enable patwáris to find fixed points in the lowlands with ease and certainty.

27. In Oudh only a few maps were left uncorrected, in Fyzabad (nine) and Sultánpur (six). The Bhitauli pargana in Bara Banki requires fresh maps and the question of providing them is under consideration; in the rest of the district the maps were regularly corrected. In Unao all but 35 maps of alluvial villages were corrected. The arrears in Lucknow (212) and Hardoi (581 apart from Shahabad tahsíl) are large, and efforts should be made to clear them off. The general condition of the maps in Partábgarh is reported to be satisfactory, while in Rae Bareli where it is otherwise the Deputy Commissioner has issued necessary orders; all work in Rae Bareli is in an unsatisfactory condition, and this is one of the districts

to which an Assistant Collector has been deputed. As noticed in the last year's report the maps of Sítápur were classified; orders for regular maintenance have been given in the case of 1,184 villages where the maps are capable of correction, and proposals regarding the remaining 1,182 maps have been submitted to the Board of Revenue. The maps in Kheri are on the whole satisfactory, but in Bahraich proper attention has not been given to their maintenance; I have addressed the local authorities on the subject. In Gonda map correction is now being started as the patwáris have returned to district work.

Concealment of rents.

28. Cases of concealment of rents of the ordinary type were detected in 12 districts but no remarkable method of doing so has been discovered. The number of such cases was large in Agra, Etáwah, Fatehpur, Basti and Gorakhpur. The result of inquiry into a case at Basti has been an increase of Rs. 4,000 in the existing rent-rolls. The Commissioner of Gorakhpur remarks that such flagrant cases have not come to his notice in Gorakhpur as in Basti where there is wholesale concealment and where the tenants will not admit the true rents for fear of further enhancement. One of the wild rumours as to the origin of plague prevalent in Basti last year ran that the scourge was Government's revenge for the concealment of rents at the last settlement. The effect of the new rule holding the supervisors responsible for the accuracy of the rent-rolls has shown itself in the increase in the percentage of errors detected by them in many districts as compared with former years, when the registrar kanúngo's test was generally known to be a sham. It must be added that the provision of the new Land Revenue Act requiring that the rent to be entered in the *khatauni* shall be the *rent payable* under the Tenancy Act has given rise to difficulties; hitherto the staff were guided by the simple rule to enter the rent demanded by the landholder and admitted by the tenant, but apparently they have now to consider also the legality of the demand. The matter has been separately referred for orders.

Preparation and maintenance of tahsíl registers.

29. Revised village registers of Aligarh, Farukhabad, Bijnor, Bareilly, Pilibhít, Benares, Mirzapur and Gonda were completed during the year. The new registers have now been provided for the whole of Oudh. The special staff under my control is employed in compiling the registers in Jaunpur and Gházipur and will, after finishing the work there, move to Ballia. Necessary instructions have been issued to the Settlement Officers of Mainpuri and Etah, while the question of preparing fresh registers has been taken up in regard to Muttra, Etáwah and Allahabad, where the extension of the term of settlement has left the old registers with insufficient space for annual entries.

30. The pargana hand-books of Sháhjahánpur and Bareilly (except one tahsíl) were published during the year. A hand-book of one of the parganas in Gonda is also out. Most of the hand-books of Aligarh, Farukhabad, Bijnor and Pilibhít, and those for the remaining parganas of Bareilly and Gonda are in press.

31. The registers are generally reported to be up to date. Eight district officers report that they are accurate: defective work was found in Muzaffarnagar and Rae Bareli, while the remaining reports are silent on the question. From the reports of my inspectors and my own examination, I think it may be fairly said that the standard of accuracy is steadily rising, but that it is not yet high enough. A contributory factor in bad work is undoubtedly in some cases the weakness of the staff in registrars' offices, and I am taking up this question during the current year.

Use of the tahsíl registers.

32. The rules and instructions issued for the use of these registers are now receiving more attention than was the case a few years ago, the improvement being due to the orders issued by the Board on my recommendation. They are not yet, however, complied with in all cases, and the Board has recently, at my instance, censured certain individual officers for their neglect.

Director's inspections.

33. The districts inspected by the Director are mentioned in the first chapter of this report. The cold weather inspection season was broken by my departure on leave, but my August tour was uninterrupted. I feel that the record work could be materially improved by more frequent inspections, made by officers rather than inspectors, and I put before the Board the outline of a scheme to meet this want. The Board

has, however, decided that the funds which I proposed to devote to this scheme are required for other purposes, and I am at present endeavouring to increase the efficiency of the existing inspection staff.

Amendment of rules.

34. A few amendments to details of the Land Records Manual have been sanctioned during the year, but they are of no great importance. The question of amending the rules to lay down definitely the patwári's duties in connection with the record of the accrual of occupancy rights has been discussed with the Board, and draft amendments prepared. The land record rules for the Bhábar have been finally settled and are being submitted to the Board.

State of the patwári funds.

35. The statutory contribution from Provincial revenues was 10 lakhs and the transactions of the year resulting in a surplus of Rs. 1,89,292 have raised the amount at credit of the funds to Rs. 4,96,899. Government has directed that the surplus of the fund should be utilized in improving the position of the patwári and kanúngo staff, and I have submitted my general proposals on the subject.

(II).—Surveys and revision of records.

36. During the year cadastral surveys accompanied by the preparation of preliminary records have been brought to a close in three districts—Azamgarh, Mainpuri and Jalaun. Under the system in force by which each patwári is allowed two years to complete the maps and records of the villages in his circle, the amount of actual field survey during the last year of operations is necessarily very small, and the cost rates for the year based on outturn of field survey are misleading. The cost rates given below are in each case those for the whole district based on the total actual expenditure and the total area surveyed in the district.

37. *Azamgarh*, (Mr. F. B. Powell in charge). All field work was practically finished by October 1902 and it was in consequence found practicable to dispense with the services of an Assistant Survey Officer and to reduce the field establishment. During the year the maps and records of tahsíl Muhammadabad have been completed and made over to the Settlement Officer. Operations were begun in October 1898, the total expenditure has been Rs. 1,21,132 and the cost rate is Rs. 56-2-5 per square mile; or, if a proportionate share of the Superintendent's salary and office charges are included, Rs. 68-3-0 per square mile. These figures do not include the pay and allowances, not borne by the survey budget, of Mr. Freeman the officer in charge for the first four years. If they were included the cost rate would be about Rs. 72 per square mile, which may be considered a very low rate for the district, where the small size of the fields and the complexity of the proprietary shares rendered the work more than usually difficult. The Azamgarh party has now been transferred to Bánda and the services of Mr. N. Chatterji have been obtained to replace those of the Assistant Survey Officer who reverted last year. In Bánda the correction of the maps and records in tahsíls Bánda and Pailani will be carried out during the present year.

38. *Mainpuri*, (Mr. L. F. Berkeley in charge, assisted by Mr. J. H. Murphy). An area of 20 square miles of survey and 611 square miles of record writing in tahsíls Shikohabad and Mustafabad remained for completion at the beginning of the year. All maps and records have now been made over to the Settlement Officer. The survey commenced in October 1899, the total expenditure has been Rs. 1,52,895, the total area surveyed is 1,676·47 square miles, and the cost rate is Rs. 91-4-9 per square mile, or including a proportionate share of the Superintendent's salary and office charges Rs. 102-6-0 per square mile. The fact that the operations have been on the two years' system throughout, and the promotion of the Survey Officer and his Assistant account for the comparatively high cost rate. The two years' system involving as it does the revision of the work of the first year to bring it up to date during the second year (B. O. No. $\frac{4002N.}{I-7}$, dated 20th September 1901) is expensive: in the districts now coming under survey where the work is either the correction of existing maps and records or partial resurvey, the one year system will be followed. In the area surveyed during the year, an average of 5·23 lineal miles of check survey were run in each square mile, while 19 per cent. of the khasra entries were examined and checked on the field. Of 220 patwáris, 211 qualified as surveyors; 18 were allowed to depute their heirs to assist in the work or to do it for them, and substitutes had to be provided for two who failed to qualify.

39. The Mainpuri party has now been transferred to Moradabad, where its programme for this year will consist in the resurvey of tahsíl Thákurdwára and the alluvial tracts in Moradabad and Amroha and the map correction of the sandy areas in Amroha.

40. *Jalaun*, (Mr. P. C. Smart in charge, assisted by Mr. C. S. Littlewood). Operations were commenced in this district in October 1900, and in order to expedite the work to suit the settlement programme two parties were employed conjointly during 1901-1902. The total expenditure has been Rs. 1,17,617, and the area surveyed 1,469 square miles. The cost rate is Rs. 80-1-0 per square mile, or allowing for a share of the Superintendent's salary and office charges Rs. 90-1-0. In order to assist the Jalaun patwáris in maintaining their maps they have each been given a set of survey instruments from the surplus stock. If credit is taken for the original cost of these instruments the cost rate of the district would fall to Rs. 74-3 per square mile. In the 175 square miles remaining for survey, and the 218 square miles remaining for *khanapuri* during the past year, an average of 3·6 lineal miles of check survey have been run per square mile, and 19 per cent. of the khasra entries checked. Out of 141 patwáris 128 have qualified in survey, eight were allowed to depute their heirs, and substitutes had to be appointed for five. The attendance of patwáris at office has been disgraceful in this district, and in spite of the punishments inflicted by the Collector and the Survey Officer, it was at one time so bad that there was considerable likelihood of the work remaining in arrears at the close of the year.

41. The Jalaun party has now been transferred to Hamírpur, where map correction will be carried out this year in parganas Hamírpur, Sumerpur and Maudaha.

42. The total expenditure on cadastral surveys during the year has been Rs. 1,13,903. Of this Rs. 19,103 was spent in Azamgarh, Rs. 39,879 in Mainpuri, Rs. 30,757 in Jalaun, and Rs. 24,164 on the Superintendent's salary and office charges, &c.

43. Settlement Officers were as usual requested to report on the maps and records prepared by the survey. The Settlement Officer of Azamgarh says the maps are very good and the records as good as can be expected; the Settlement Officer of Mainpuri defers an expression of his opinion till he has seen more of the records.

44. *Traverse Section.*—This section under Mr. F. S. Bell, has traversed an area of 139·73 square miles in tahsíl Thákurdwára of Moradabad district, at a cost of Rs. 29-7-10 per square mile. Main circuit traverses have also been run in advance, along the high banks of the Ramganga and Dhela, to allow of both traverse and cadastral surveys being completed this year in the alluvial tracts. The cost rate for this has been Rs. 11-9-7 per lineal mile. The work proved satisfactory; it was connected with the Great Trigonometrical Stations of Akbarpur, Bhatauli and Nandi, the error disclosed amounting to 1·2 and 3·4 feet per lineal mile. This year, in addition to the detailed traverse of the alluvial tracts along the Ramganga and Dhela, main circuits will be run along the high banks of the Ganges in preparation for next year's traverse of the Ganges khádir.

45. *Municipal Surveys.*—The following towns have been surveyed on the scale of 64 inches to one mile, with open ground on the scale of 16 inches to the mile. These surveys were very detailed, the interior limits of houses in blocks being shown on the maps. The cost rate was Rs. 1,291-14-5 per square mile.

| | Square miles. |
|---|---|
| Aligarh ... ... ... | 4·27 |
| Háthras ... ... ... | 3·21 |
| Atrauli ... ... ... | ·99 |
| Sikandra Rao... ... ... | ·88 |

In Kosi (·70 square miles), a survey on the scale of 64 inches to the mile with open ground on the 16 inches scale showing only exterior limits of buildings, has been made at a cost of Rs. 910 per square mile. In Allahabad the survey of an extension of the civil station has been finished on the scale of 200 feet to one inch, at a cost rate of Rs. 521-14-5 per square mile. In Fyzabad and Ajodhia, where town surveys had been completed during the previous year, it has been found necessary to retain a small establishment to give effect on the maps to the Settlement Officer's decisions in the very numerous dispute cases which have

arisen. There still remain a large number of disputes to be dealt with, and the survey establishment will be required for some months longer. At the close of the settlement operations, wall maps of both towns will be compiled and printed.

46. *Road Surveys.*—Boundary charts on the scale of 64 inches to the mile showing all adjacent detail, were prepared for 1,113·09 lineal miles of 1st class roads in Etah, Muttra, Aligarh, Bulandshahr and Meerut. Ninety-nine miles were resurveyed independently as a check upon the accuracy of the work. The cost rate was Rs. 8-14-5 per lineal mile.

47. *Miscellaneous work.*—The patwáris in the hilly areas of tahsíls Meja and Bara of Allahabad were trained in survey. The maps in these tahsíls are very much out of date and the patwáris being required for settlement duties immediately at the close of their survey training could not take up their map correction. Close supervision by the district staff will be necessary, if the results of the training are to be utilized. The patwáris in the tahsíls of Bánda and Hamírpur that are coming under survey this year, were trained in May and June; this will be of great assistance in view of the heavy programme to be worked through in these districts. The maps of Lalitpur surveyed in 1894—97 were inspected and reported on in February and March. Although the field boundaries were found to have altered greatly since survey, the maps have been maintained with considerable success.

48. *Drawing Office.*—(Under Mr. J. Kennedy.) Eleven standard sheets including areas in Sháhjahánpur, Bareilly, Pilibhít and Kheri have been drawn and submitted for publication. Twenty-five standard sheets and two district maps are in hand. The drawing office was instituted in 1898, five years after the cadastral surveys by patwári agency were commenced, and as the survey outturn during these years was very great, the compilation of standard maps started heavily in arrears, which it has not yet been found possible to clear off.

## (III).—Classification of holdings and rental statistics.

49. The statements of holdings and rental statistics for 1902-1903 or 1310 fasli are appended for both the provinces separately; their form has been changed in order to show the classes of tenants now recognised by law. The total holdings area which showed a satisfactory increase in 1308 and 1309 fasli, advanced in the year of report by 152,350 acres in Agra and by 82,629 acres in Oudh. The improvement was shared by all the divisions, but was greatest in Allahabad and Lucknow; cultivation is recovering in Bundelkhand and in Hardoi. The other noticeable feature of the return for Oudh is that, compared with the figures reported last year, the area held without rent or free of rent exhibits an increase of a lakh of acres, in consequence of the transfer to this head of the area of tenants' holdings on which no rent has been determined. In Agra the area under *sír* again declined by 14,629 acres; but that held as *khudkásht* increased by 64,217 acres, mainly in consequence of the inclusion under this head of the land held by *thekadárs*. Land held by permanent tenure holders and fixed-rate tenants, which was hitherto returned with that held by ex-proprietary tenants, is now shown separately. It amounts to 714,053 acres, including some small areas returned in temporarily-settled districts. I am doubtful if the classification is correct in these cases and inquiries are being made. As in past years, the recorded occupancy area continued to decline in most districts; but as the new settlement record gave an increase of 62,918 acres in Farukhabad, of 49,478 acres in Bareilly and of 148,192 acres in Sháhjahánpur, the total recorded occupancy area of the province rose by 126,638 acres. Land held without rent or free of rent shows an increase of 126,121 acres for reasons stated in the case of Oudh. The statement shows the area held on lease for seven years or more, and the figures are of some interest in connection with the practical working of the tenancy law. Over three hundred thousand acres were held on these leases during the year, four-fifths of which are in the Meerut division, one-third of the whole being in Bulandshahr. Bijnor and Muttra follow their neighbours' example, and at the other end of the province some of the eastern districts have relatively considerable areas leased. The figures for the Meerut division are probably under-statements as information regarding Aligarh is not available.

*Vide* appendix.

Variations.

50. The rent-paying-area of the United Provinces, which, in each of the preceding two years, rose by over three lakhs of acres, shows this year a slight decrease of 46,337 acres. It took place chiefly in the three eastern divisions of Benares,

Gorakhpur and Fyzabad. The total rental demand amounted to 1,326 lakhs of rupees and the total recorded collections to 1,222 lakhs of rupees, of which 1,045 were on account of 1902-1903 and 177 on account of previous years. The percentage of total recorded collections to total demand rose from 88 to 90 in Agra and from 95 to 98 in Oudh. For the province as a whole, it was 92 as compared with 90 in 1309 fasli. In the Rohilkhand division alone, the percentage fell from 91 to 89; in the other divisions it was higher than in the preceding year. In the Benares division, the percentage rose from 74 to 80, a change which probably indicates better statistics and not better income.

## CHAPTER III.

### ARBORICULTURE.

Summary of work done.

51. There has been no change in the system of control described in last year's report. The Public Works Department maintain and extend avenues on the provincial roads, while the District Boards manage operations on local roads, and occasionally maintain groves or plantations. Information as to the length of avenues is considerably more accurate than was the case a few years ago: about 57 miles of paper avenues, (as those may be called where the trees do not exist except on paper), have been struck off during the year, while 202 miles are reported to have been established during the year, this expression denoting that the trees have grown sufficiently to require no more attention as regards watering and fencing.

52. New planting has been carried out on 270 miles during the year. Nine miles of this length were planted by private persons with the permission of the authorities, while a considerable number of trees were planted in the same way on shorter lengths of road in Cawnpore and Jaunpur. The least suitable kinds of trees are now rarely planted, but I am frequently struck by the preference given to unproductive trees such as shisham and nim. The mango is an ideal avenue tree, and even if the District Board does not desire to make an income from its fruit, the annual crop is an immense boon to the poorest classes, and it seems a pity to see the roadsides in fertile tracts planted with trees that will never yield an income either to the Board or to the people until the time comes to cut them down. The cause of this defect is usually to be found in want of attention at the time the nurseries are being stocked, and I am endeavouring to guard against it as far as possible by drawing attention to the matter when working plans are being drawn up or revised.

Maintenance of working plans.

53. Working plans were adhered to in most districts; in one or two cases defects in the plans came to light and revision was necessary; the weather interfered in one instance, defective administration was responsible for failure in two, and individual caprice in six.

Financial results.

54. The expenditure on provincial roads was Rs. 27,705, while the income amounted to Rs. 47,701 (or Rs. 11,000 more than in the previous year), leaving a surplus of just under Rs. 20,000. The income was made up (in round figures) as follows:—Sale of trees cut down (Rs. 16,000), sale of fallen trees (Rs. 6,800), loppings (Rs. 1,400), grass (Rs. 16,900), other annual produce and miscellaneous (Rs. 6,600). The income from trees cut down is strikingly high, but I do not think it indicates that any roads are being denuded of avenues. The recurring income shows a satisfactory rise. The expenditure figures call for no remarks.

55. The local roads also returned a small net surplus to the District Boards, receipts being Rs. 72,719 and expenditure Rs. 70,234. The corresponding figures in the previous year were Rs. 63,027 and Rs. 67,332, so that the surplus is due not to parsimony but to increased income—a satisfactory feature, specially as the greater part of it is derived from annual produce and not from timber. The Bundelkhand Boards, which get practically no income from grass or fruit, work annually at a loss; in most of the remaining districts where the deficit is considerable, (Farukhabad, Cawnpore, Jaunpur, Lucknow, Rae Bareli, Hardoi and Sultánpur), the income is very small, and in the case of Rae Bareli and Sultánpur grass brought in nothing whatever. On the other hand some Boards make a considerable net income, Bulandshahr with over Rs. 4,000 in the year being the most successful. It is

noticeable that the same Boards show very much the same results year after year: and the natural conclusion is that in many cases the members and officers of the Boards do not interest themselves in the matter, but leave the income to be realized as part of the routine work of their office. The Boards (always excluding those of Bundelkhand) which incur an annual deficit have the remedy mainly in their own hands.

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## CHAPTER IV.

### Assistance given to the public.

Distribution of implements.

56. The implement depôt at Cawnpore continued to supply a distinct though limited want. The sale of ploughs increased after the drop of the previous year, and 130 were sold, half of which were of the cheapest type, known as the Meston. The trials of the double-geared chain pump by cultivators in the Meerut division were mismanaged: I hope those of the present year will be more satisfactory. The Baldeo lift was used continuously at the farm during the year, and the experience gained has apparently converted my farm staff to a belief in its value. Some cultivators near the farm who saw it at work bought a similar lift for their own use and employed it regularly: the fact is that the great rise in wages in Cawnpore makes it hard for cultivators near the city to get any labour at all, and sometimes actually impossible to get men to work at heavy jobs such as raising water by basket: in this case, therefore, there is a distinct opening for this lift which employs a bullock and a boy in place of four strong labourers. It may be mentioned that the Kashmir State obtained a selection of implements from the department during the year.

Distribution of seed.

57. The demand for seed, purchased for cash at Cawnpore, shows a marked increase: 588 maunds were sold as against 336 in the preceding year. These transactions are conducted mainly with landholders and planters, and a large amount of seed has gone outside the province, especially to Bihar. The chief demand is for the soft white wheat of the Meerut division, known as Muzaffarnagar wheat, of which about 225 maunds were issued. The other staples in demand were barley, gram, Jaunpur maize, and to a less extent oats and rape.

A European planter in Gorakhpur, who was trying the Muzaffarnagar wheat obtained last year 41 maunds to the acre in one trial—an outturn which caused considerable stir in the locality as it well might: of course it must be remembered that the season generally was exceptionally favourable for wheat.

58. Our dealings with smaller cultivators are conducted not in cash but in grain on the system described in last year's report. The seed is not "selected" in the technical meaning of the term: that is to say, it is not the produce of individual plants selected for their marked advantages: but it is carefully chosen by expert buyers, and is then cleaned so as to exclude all deformed seeds and foreign matter. The clean seed is issued to the cultivators at 25 per cent., and what they return is examined, the best kept for re-issue, and the inferior lots sold off. Operations continued at all the centres enumerated in last year's report and were extended to the vicinity of the Cawnpore experiment station. The demand increases and over 4,000 maunds of these seeds were issued during the year under report: while we have recently had to import 800 maunds more to meet the demand for the current season. Here, too, the Muzaffarnagar wheat is our chief article; and it is instructive to recall that when I began this work I was advised by competent authorities on no account to offer foreign seed but to give the people the best of the local produce: now our cultivators very much prefer the imported stuff. We are now issuing kharif seed also, though not to the same extent as rabi seed: and an experiment is being made on a small scale to see if the highest classes of rice, which are usually grown in the submontane districts and fetch fancy prices, can be grown with success in the rice tracts of South Oudh. The demand during the year was collected without loss, and the profit which has accumulated is employed in extending our business. An untoward feature of the late season was the appearance of weevils in two of our stores, due to the exceptionally damp weather of October: the prompt action of the Assistant Director was successful in avoiding any serious loss from these pests.

In connection with this branch of our work I desire to acknowledge particularly the assistance afforded by the Special Manager of the court of wards estates in Partábgarh: Mr. Hill has co-operated enthusiastically with the department for several years, and the estates under his charge have now a supply of seed-grain which is probably unequalled for quality in the province.

Boring for wells.

59. The demand for trained borers has increased, and we now have 17 trained men on our list as against 10 in the previous year. These men have conducted 183 borings, (as against 146), and have also been employed in giving assistance in the actual construction and repair of wells. The demand for the supervisor's advice has been rather smaller than in the previous year, but his time has been more than fully occupied; for some months he was at work in Allahabad under the special orders of Government.

60. I have recently discussed the question of wells in the tarái with the Superintendent of the Government estates, and we have agreed to carry out the supervisor's recommendations in a few experimental cases: the wells are for the supply of drinking water and not for irrigation, but the question is directly agricultural as it is the badness of the water more than any other single cause which makes the cultivation so unstable in these tracts.

61. I am awaiting the orders on the report of the Irrigation Commission before formulating proposals for the development of this branch of the work of the department.

Other kinds of assistance.

62. *Cattle-breeding.*—Seven bulls were issued during the year, (three sold and four on loan), while three bulls were kept at the Cawnpore Experiment Station for the use of the public. Some progress has been made in organizing the bull depôt for Bundelkhand; I have had much difficulty in finding a suitable site but I believe that this has been overcome, and I hope we shall be able to start work with some young stock in the present cold weather.

63. *Veterinary dispensary.*—This small institution has suffered owing to the frequent deputation of the salutri in charge on work away from Cawnpore; endeavours are being made to keep him at headquarters as much as possible, but with a small staff and constantly-growing work I do not at present see my way to keeping the dispensary open regularly.

## CHAPTER V.

### Supply of Information.

Publications.

64. The only departmental publication of the year was the Assistant Director's monograph on the sugar industry of the provinces. The Deputy Director's work on wheat rusts was carried on in collaboration with the Cryptogamic Botanist who I understand will publish the results in due course. Material for one or two fresh bulletins has been accumulated, which I hope to prepare for publication during the current year.

65. It has been decided that the entomological circulars now being issued by the Indian Museum shall be published in vernacular, condensed where desirable, in the series of popular bulletins, and the earlier circulars are now in preparation.

Agricultural Journal.

66. The circulation of the Agricultural Journal, published in Urdu, has risen considerably, close on 600 copies being issued monthly as against 427 at the end of last year. The style of the journal remains unchanged, and the increase in circulation indicates that it meets a want.

Summary of correspondence.

67. The number of private correspondents rose from 893 to 913 during the year, and as usual their letters dealt with such a variety of subjects that accurate classification of them is hardly possible. The subjects most commonly dealt with are seeds, implements, and (recently) methods of sugar manufacture.

## CHAPTER VI.

### Associations, Shows and Demonstrations.

Agricultural Associations.

68. No meeting of the managers of court of wards estates was held during the year as the officiating Director did not consider it advisable to hold it in my absence. A meeting will be held early in March 1904.

69. The report of the Porter Agricultural Association in Allahabad shows a record of solid work accomplished in the way of introducing new staples and assisting the cultivators with loans, maintenance of a stud bull and other useful ways. The Secretary, Rai Thakur Mahabir Prasad Narain Singh Bahadur, reports that the members of the Association have been greatly encouraged by the interest in their work shown by his Honor the Lieutenant Governor when he visited Baraon during the course of the year. The Bijnor and Sultánpur Associations have been quiescent.

Agricultural Shows.

70. Shows were held during the year at Kakora (Budaun), Aligarh, Bulandshahr, Muzaffarnagar, Meerut and Sultánpur. The last was attended by the Assistant Director and the remainder by other departmental officials. In Sultánpur, where the agricultural exhibits were most numerous, about 1,600 specimens of grain were exhibited, mainly the produce of seed grains issued from our depôt. The lectures and demonstrations of sugar-boiling and dairy work given by the Assistant Director were largely attended. The people in Sultánpur seem to take more spontaneous interest in the show than do those of the districts further west where strictly agricultural work is as a rule subordinated to the interests of horse-breeding—a most important subject but one of personal interest to the minority only. The remaining agricultural shows presented no features of special interest. Five cattle-shows were held during the year, the prizes for which, two medals and cash prizes of Rs. 500 at each show, were provided by the Government of India. Three of the shows were held in the breeding districts of NorthOudh, and the other two in Bundelkhand. There are indications that these shows will serve their object in interesting breeders in the quality of the cattle; they were naturally regarded with some suspicion as being novelties, but this will I think soon disappear. The department was represented on the judging committees by the Deputy Director at three shows and the Assistant Director at the remainder. During the current year the committees will be materially strengthened by the presence of the Superintendent of the Civil Veterinary Department, who has now been relieved of the bulk of the horse-breeding work which formerly took up his whole time.

Demonstration farms.

71. The Meerut Demonstration Farm, which was formerly under the control of the District Board, was brought under the direct management of the department in the beginning of the year under report. During the rabi season the old programme of work was followed, the total area of the farm being 103 acres; but since the commencement of the current agricultural year the area has been reduced to about 54 acres, out of which 50 are now under cultivation. Experimental work has been abandoned, and the land is farmed with the objects of making it pay its way and demonstrating practices which are not common in the neighbourhood but which have proved advantageous elsewhere. Nothing can be said at present as to the financial results of management under this system as a complete agricultural year has not elapsed; the accounts will be made up to the end of each rabi season.

72. The private demonstration farm at Jatau, owned and managed by Kuar Karan Singh, continued its useful work. The owner of the Sultánpur farm has been unable owing to family bereavements to give much attention to his land during the year.

Sugar factory.

73. The Assistant Director has now worked out practically the complete process of sugar-making by the improved plant which he has designed. Steady work on a commercial scale is, however, necessary before the process can be recommended to the public. The continuous trials which I hoped to arrange last year had to be postponed as the Bareilly manufacturers who had promised to assist were detained at Delhi by certain contracts in which they were interested: I hope nothing will interfere with the trials arranged for the current season.

## CHAPTER VII.

### Agricultural Education.

The agricultural school.

74. The post of Principal has been held throughout the year by Mr. B. V. Patwardhan. The final examination of the class admitted in 1901 was held in April 1903 by the

officers of the department. There were no failures, but the proportion of passes in the first division was lower than in the preceding year, and the teaching in agriculture had not been altogether up to the previous standard. The staff has been changed to remedy this defect, and the services of a teacher obtained through the Inspector-General of Agriculture. The course of studies and practical work has undergone no material change. The cattle club, which owns bullocks for use in cultivating the students' plots, appears likely to be successful and the other clubs and institutions have worked well. The school was inspected in February 1903 by the officiating Inspector of Schools, whose report was favourable. The question of improved laboratory and other accommodation which was awaiting orders on the question of establishing an agricultural college has now been taken up. The health of the students has been satisfactory during the year.

Moradabad Normal School.

75. The agricultural class established in 1901 consisted of 20 students. Eighteen of them appeared at the final examination in April last and passed out successfully in the first division, almost all being distinguished in practical agriculture, which represents a high standard of proficiency. The class formed in July 1902 consists of 24 students. They passed their examination of junior class very creditably in April, 22 being placed in the first and two in the second division. The two examinations were conducted partly by the Assistant Director and partly by the Deputy Director. The junior class formed in July 1903 consists of 30 students. The course of training usually extends over two years so that each class has an opportunity of making observations of two kharif and two rabi crops. Besides the teaching in the lecture-room and observations in the fields near the school each student is required to cultivate small areas of land with his own hands at the demonstration farm attached to the school. This farm comprises an area of about 22 acres and its management by the agricultural instructor has been satisfactory, the operations having been carried on in accordance with programmes sanctioned for each season by this department. The only land available is dry sandy stuff, with a few isolated patches worth good cultivation; the treatment adopted has been calculated to effect a gradual improvement in its quality and some success has been already attained.

76. On the whole the results of the teaching are better than I hoped for when the class was started. I find however that no use is made of the special training given to the students. The object with which the class was started was to provide teachers competent to introduce agriculture as a regular subject in the course of the secondary vernacular schools (*vide* G. O. No. $\frac{362}{XV-388}$ dated 21st August 1900). I understand, however, that the Department of Public Instruction does not contemplate any development in this direction at present, and that the students of the school trained in agriculture do exactly the same work as those without this training. I have therefore asked the Director of Public Instruction whether the class is serving any useful purpose; so far as I can see it is a waste of energy.

Royal Agricultural College.

77. The last scholarship-holder at the Royal Agricultural College, Sheikh Maqbul Husain, B.A., has returned to India and been appointed to the provincial executive service of these provinces. It has now been decided that the funds hitherto given to supporting students of agriculture in India shall be devoted to provincial scholarships tenable at the agricultural college which the Government of India is establishing at Pusa.

Village schools.

78. The department has not been consulted during the year on questions affecting the course of teaching in ordinary schools. An application was received for illustrations to demonstrate the growth of some crops commonly cultivated in the provinces. With the concurrence of the Director of Public Instruction I refused this application holding that the growth of common crops should be illustrated by actual specimens and not by pictures. Lesson-sheets have a certain limited value in education, but in this instance they would be entirely out of place.

## CHAPTER VIII.

### MISCELLANEOUS.

Village Banks.

79. My inspector has been engaged throughout the year in auditing the accounts of existing village banks, or co-operative credit societies, as they must be called when the bill before the Legislative Council is passed into law. The number of banks has decreased as those founded to order gradually disappear : their disappearance is not a subject for regret. Quite a number of the banks are showing some ability in handling their capital profitably, and a few are attracting a deposit capital of their own. I think the experience gained is sufficient to show that these institutions have a real though limited scope in these provinces, and that if founded in places where the ordinary obstacles to success do not exist they will be permanent, and will be of the very greatest advantage to their members, not so much in these times of prosperity, (though even then they offer substantial advantages), as in the seasons of adversity which we must expect to recur. The lines of further development depend on the shape ultimately taken by pending legislation, and still more on the selection of the registrar.

Export of hemp.

80. In previous reports I have noticed the extension of the export of hemp fibre. The trade appears to be established on a satisfactory basis in Rohilkhand ; the instructions which were issued there for the proper preparation of the fibre have been published during the year in the Mainpuri district where an exporting firm complained of the dirt and carelessness that reduced the value of the product.

Conclusion.

81. It only remains for me to conclude by expressing my acknowledgments to my staff for the assistance they have afforded me during the past year. In a department of growing activity the pressure on the staff tends to be excessive, as every addition to the *personnel* is immediately followed by a corresponding increase in activity and very little leisure has been enjoyed of late. I would specially mention the devotion of the Assistant Director to the details of seed-distribution, work which would utterly break down without constant supervision, and the efficient manner in which my Personal Assistant has conducted the office work in general and the compilation of statistics in particular.

I have the honour to be,

SIR,

Your most obedient servant,

W. H. MORELAND,

*Director.*

*Statement showing classification of holdings and rental statistics for* 1310 *fasli of Agra.*

| Districts. | Area of holdings. | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Held as sír. | Held as Khúdkásht and Thekedar's cultivation. | Held without rent or free of rent. | Held by permanent tenure holders and fixed rate tenants. | Held by ex-proprietary tenants. | Held by occupancy tenants. | Held by non-occupancy tenants. | | | Total area of holdings (Columns. 2 to 10.) |
| | | | | | | | On lease for not less than 7 years. | For 12 years or more. | For less than 12 years. | |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
| | Acres. | Acres. | Acres. | Acres. | Acres. | Acres. | Acres. | Acres. | Acres. | Acres. |
| Dehra Dún ... | 7,732 | 27,767 | 565 | ... | 57 | 14,595 | 10,479 | 6,020 | 35,605 | 102,820 |
| Saháranpur ... | 180,413 | 155,589 | 19,928 | ... | 8,318 | 153,776 | 39,539 | 39,222 | 311,389 | 908,174 |
| Muzaffarnagar ... | 144,732 | 99,488 | 17,196 | ... | 9,351 | 213,169 | 23,023 | 29,447 | 231,244 | 767,650 |
| Meerut... ... | 247 342 | 251,192 | 20,384 | ... | 6,180 | 277,773 | 65,457 | 22,855 | 254,215 | 1,145,398 |
| Bulandshahr ... | 110,739 | 74,478 | 12,163 | ... | 7,150 | 382,804 | 100,885 | 49,249 | 197,257 | 934,725 |
| Aligarh† ... | 373 | 151,546 | 10,371 | ... | 6,670 | 238,750 | ... | 162,628 | 377,504 | 947,842 |
| Total ... | 691,331 | 760,060 | 80,607 | ... | 37,726 | 1,280,867 | 239,383 | 309,421 | 1,407,214 | 4,806,609 |
| Muttra ... | 92,527 | 119,101 | 11,626 | 20 | 8,208 | 172,303 | 8,726 | 104,916 | 241,381 | 758,808 |
| Agra ... | 108,527 | 34,481 | 18,483 | ... | 17,774 | 296,104 | 2,409 | 175,638 | 191,362 | 844,778 |
| Farukhabad‡ ... | 80,676 | 21,019 | 21,855 | ... | 12,304 | 363,889 | 5,660 | 28,880 | 136,752 | 671,035 |
| Mainpurí† ... | 61,382 | 18,849 | 32,087 | ... | 9,029 | 271,957 | ... | 124,241 | 117,788 | 635,333 |
| Etáwah ... | 48,139 | 16,442 | 35,578 | ... | 5,716 | 216,746 | 811 | 166,668 | 105,916 | 596,016 |
| Etah† ... | 79,081 | 26,548 | 18,563 | ... | 16,909 | 285,808 | ... | 111,864 | 195,204 | 733,977 |
| Total ... | 470,332 | 236,440 | 138,192 | 20 | 69,940 | 1,606,807 | 17,606 | 712,207 | 988,403 | 4,239,947 |
| Bareilly ... | 30,310 | 22,231 | 13,510 | ... | 6,771 | 484,847 | 1,920 | 46,695 | 206,501 | 812,785 |
| Bijnor ... | 46,443 | 48,111 | 35,906 | ... | 4,418 | 267,627 | 9,976 | 53,518 | 259,980 | 725,979 |
| Budaun ... | 118,433 | 31,462 | 10,812 | ... | 22,845 | 482,700 | 3,677 | 68,141 | 276,548 | 1,014,618 |
| Moradabad ... | 53,768 | 59,454 | 3,651 | 5 | 10,855 | 404,920 | 4,693 | 212,157 | 388,961 | 1,138,464 |
| Sháhjahánpur ... | 75,229 | 28,087 | 6,014 | 19 | 15,320 | 409,493 | 1,493 | 48,387 | 221,917 | 805,959 |
| Pilibhít† ... | 992 | 17,187 | 6,857 | ... | 1,847 | 118,643 | ... | 115,707 | 154,621 | 415,854 |
| Total ... | 325,175 | 206,532 | 76,750 | 24 | 62,056 | 2,168,230 | 21,759 | 544,605 | 1,508,528 | 4,913,659 |
| Cawnpore ... | 71,766 | 36,778 | 24,872 | ... | 8,416 | 357,846 | 608 | 147,234 | 237,458 | 884,978 |
| Fatehpur ... | 46,783 | 39,843 | 51,967 | ... | 2,315 | 249,156 | 366 | 117,820 | 115,927 | 624,177 |
| Bánda ... | 152,816 | 154,291 | 10,939 | 5,322 | 6,704 | 179,977 | 396 | 154,028 | 367,994 | 1032,467 |
| Hamírpur ... | 149,027 | 107,744 | 18,917 | ... | 14,589 | 104,626 | 224 | 129,642 | 321,447 | 846,216 |
| Allahabad ... | 129,379 | 43,001 | 45,315 | ... | 11,343 | 511,474 | 270 | 231,239 | 244,368 | 1,216,389 |
| Jhánsi... ... | 112,120 | 149,929 | 53,752 | ... | 9,715 | 171,647 | 2,407 | 95,681 | 304,000 | 899,251 |
| Jalaun† ... | 95,353 | 81,275 | 12,066 | ... | 9,173 | 80,112 | ... | 74,517 | 208,017 | 560,513 |
| Total ... | 757,244 | 612,861 | 217,828 | 5,322 | 62,255 | 1,654,838 | 4,271 | 950,161 | 1,799,211 | 6,063,991 |
| Benares ... | 78,832 | 20,853 | 9,447 | 89,554 | 3,770 | 175,790 | 4,736 | 26,306 | 33,703 | 442,991 |
| Mirzapur ... | 118,770 | 67,026 | 17,035 | 123,827 | 1,024 | 130,728 | 2,125 | 119,295 | 173,851 | 753,681 |
| Jaunpur ... | 98,569 | 32,449 | 42,697 | 298,963 | 1,779 | 137,402 | 1,429 | 50,319 | 27,935 | 691,542 |
| Gházipur ... | 187,945 | 25,214 | 5,776 | 76,144 | 4,456 | 242,890 | 1,936 | 72,665 | 43,579 | 660,605 |
| Ballia ... | 154,572 | 17,587 | 11,866 | 120,188 | 4,069 | 191,597 | 4,578 | 55,510 | 50,898 | 610,865 |
| Total ... | 638,688 | 163,129 | 86,821 | 708,676 | 15,098 | 878,407 | 14,804 | 324,095 | 329,966 | 3,159,684 |
| Gorakhpur ... | 276,292 | 275,663 | 33,177 | 11 | 6,482 | 738,605 | 3,628 | 396,328 | 452,352 | 2,182 538 |
| Basti ... ... | 182,464 | 260,704 | 3,445 | ... | 2,772 | 275,756 | 1,293 | 235,265 | 344,183 | 1,305,882 |
| Azamgarh† ... | 293,078 | 57,810 | 5,236 | ... | 9,313 | 276,449 | ... | 135,963 | 82,854 | 860,703 |
| Total ... | 751,834 | 594,177 | 41,858 | 11 | 18,567 | 1,290,810 | 4,921 | 767,556 | 879,389 | 4,349,123 |
| Naini Tál ... | 3,673 | 4,341 | 2,111 | ... | 176 | 14,457 | ... | 36,843 | 130,449 | 192,050 |
| Total, Agra ... | 3,638,277 | 2,577,540 | 644,167 | 714,053 | 265,818 | 8,894,416 | 302,744 | 3,644,888 | 7,043,160 | 27,725,063 |

† Figures for 1902-1903 have not been received owing to survey or settlement operations being in progress, hence figures for 1901-1902 have been repeated.

‡ Figures for only a portion of the district are for 1902-1903, those for the remaining portions have been taken from previous years' returns.

*Statement showing classification for holdings and rental*

| Districts. | Uncultivated land included in holdings. | Rent free and nominally rented area. (Columns 2 to 4.) | Rental | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | Cash rented land.* | | | | | | Grain-rented |
| | | | Permanent tenure holders, fixed rate, ex-proprietary, and occupancy tenants. | | Non-occupancy tenants. | | Total. | | Area. |
| | | | Area. | Rent. | Area. | Rent. | Area. | Rent. | |
| 1 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 |
| | Acres. | Acres. | Acres. | Rs. | Acres. | Rs. | Acres. | Rs. | Acres. |
| Dehra Dún ... | 6,205 | 36,064 | 14,652 | 37,121 | 52,104 | 2,41,530 | 38,071 | 1,74,380 | 28,685 |
| Saháranpur ... | 34,811 | 355,930 | 155,805 | 6,74,497 | 302,874 | 17,78,082 | 458,679 | 24,52,579 | 93,565 |
| Muzaffarnagar ... | 20,685 | 261,416 | 216,838 | 9,93,352 | 233,810 | 17,71,465 | 450,648 | 27,64,817 | 55,586 |
| Meerut ... | 21,667 | 518,918 | 279,556 | 15,21,454 | 318,538 | 27,99,761 | 598,094 | 43,21,215 | 28,386 |
| Bulandshahr ... | 28,087 | 197,380 | 588,388 | 18,75,994 | 338,364 | 26,99,625 | 726,752 | 45,75,619 | 10,593 |
| Aligarh† ... | 30,172 | 162,290 | 245,420 | 12,81,019 | 540,132 | 33,37,937 | 773,964 | 45,75,082 | 11,588 |
| Total ... | 141,627 | 1,531,998 | ... | ... | ... | ... | 3,046,208 | 1,88,63,692 | 228,403 |
| Muttra ... | 20,202 | 223,254 | 180,531 | 7,62,428 | 355,023 | 19,09,471 | 535,507 | 26,71,823 | 47 |
| Agra ... | 33,436 | 161,491 | 313,878 | 14,06,440 | 369,409 | 19,01,435 | 683,287 | 33,07,875 | ... |
| Farukhabad‡ .. | 20,753 | 123,550 | 375,944 | 15,80,649 | 169,046 | 6,35,433 | 544,990 | 22,16,082 | 2,495 |
| Mainpuri† ... | 53,294 | 112,318 | 280,986 | 12,09,383 | 242,029 | 11,99,837 | 519,550 | 24,02,442 | 3,465 |
| Etáwah ... | 34,375 | 100,159 | 222,462 | 10,96,281 | 273,395 | 14,68,848 | 494,960 | 25,62,320 | 897 |
| Etah† ... | 72,934 | 124,192 | 302,717 | 11,20,949 | 307,068 | 12,18,808 | 604,474 | 23,28,266 | 5,311 |
| Total ... | 234,994 | 844,964 | ... | ... | ... | ... | 3,382,768 | 1,54,88,808 | 12,215 |
| Bareilly ... | 33,517 | 66,051 | 470,814 | 20,90,360 | 170,477 | 8,51,888 | 641,291 | 29,42,248 | 105,443 |
| Bijnor ... | 65,205 | 130,460 | 222,871 | 12,70,103 | 199,614 | 12,65,842 | 422,485 | 25,35,945 | 173,034 |
| Budaun ... | 28,689 | 160,707 | 500,738 | 17,00,698 | 334,885 | 13,09,582 | 835,623 | 30,10,280 | 18,288 |
| Moradabad ... | 62,131 | 116,873 | 415,780 | 16,10,032 | 605,811 | 25,38,013 | 720,744 | 32,24,078 | 300,847 |
| Sháhjahánpur ... | 37,517 | 109,330 | 423,593 | 14,67,304 | 268,470 | 9,34,162 | 692,063 | 24,01,466 | 4,566 |
| Pilibhít† ... | 40,214 | 25,036 | 120,490 | 5,09,372 | 270,328 | 9,00,909 | 268,465 | 10,02,994 | 122,353 |
| Total ... | 267,273 | 6,08,457 | ... | ... | ... | ... | 3,580,671 | 1,5 ,17,011 | 724,531 |
| Cawnpore ... | 39,170 | 133,416 | 366,262 | 18,03,539 | 385,300 | 20,28,551 | 751,558 | 38,31,995 | 4 |
| Fatehpur ... | 60,608 | 138,593 | 251,471 | 11,68,595 | 234,113 | 10,77,280 | 485,028 | 22,42 840 | 556 |
| Bánda ... | 165,882 | 318,046 | 191,701 | 4,60,534 | 521,772 | 11,95,715 | 713,473 | 16,56,249 | 948 |
| Hamírpur ... | 124,023 | 275,688 | 119,211 | 3,20,009 | 449,893 | 10,09,659 | 569,104 | 13,29,668 | 1,424 |
| Allahabad ... | 168,327 | 217,695 | 522,817 | 23,71,003 | 475,877 | 19,32,613 | 996,831 | 42,99,506 | 1,863 |
| Jhánsi ... | 176,788 | 315,801 | 181,362 | 3,29,870 | 401,612 | 5,67,159 | 582,974 | 8,97,029 | 476 |
| Jalaun† ... | 61,260 | 188,694 | 89,285 | 3,01,458 | 282,534 | 9,40,979 | 371,783 | 12,42,376 | 36 |
| Total ... | 796,058 | 1,587,933 | ... | ... | ... | ... | 4,470,751 | 1,54,99,663 | 5,307 |
| Benares ... | 24,330 | 109,132 | 262,754 | 11,00,447 | 61,920 | 3,46,425 | 324,674 | 14,46,872 | 9,185 |
| Mirzapur ... | 182,989 | 202,831 | 252,565 | 8,07,201 | 239,150 | 5,74,265 | 491,715 | 13,81,466 | 59,135 |
| Jaunpur ... | 55,730 | 173,715 | 428,936 | 19,29,490 | 76,924 | 3,99,650 | 505,860 | 23,29,140 | 11,967 |
| Gházipur ... | 53,097 | 218,935 | 315,160 | 12,79,799 | 109,427 | 5,92,237 | 424,587 | 18,72,036 | 17,083 |
| Ballia ... | 70,043 | 184,025 | 306,488 | 12,23,028 | 104,351 | 4,33,650 | 410,839 | 16,56,678 | 16,001 |
| Total ... | 386,189 | 888,638 | ... | ... | ... | ... | 2,157,675 | 86,86,192 | 113,371 |
| Gorakhpur ... | 113,168 | 585,132 | 744,366 | 22,51,455 | 851,493 | 23,44,183 | 1,595,859 | 45,95,638 | 1,547 |
| Basti ... | 32,165 | 446,613 | 275,491 | 11,25,512 | 557,937 | 21,87,473 | 833,428 | 33,12,985 | 25,841 |
| Azamgarh† ... | 90,991 | 356,124 | 285,762 | 14,60,729 | 218,817 | 11,10,905 | 481,726 | 25,09,041 | 22,853 |
| Total ... | 236,324 | 1,387,869 | ... | .. | ... | ... | 2,911,013 | 1,04,17,664 | 50,241 |
| Naini Tál ... | 13,113 | 10,125 | 14,633 | 47,317 | 167,292 | 3,50,959 | 141,277 | 3,14,681 | 40,648 |
| Total, Agra ... | 2,075,578 | 6,859,984 | ... | ... | ... | ... | 19,690,363 | 8,43,87,711 | 1,174,716 |

* In the nineteen districts, Saháranpur, Muzaffarnagar, Meerut, Bulandshahr, Farukhabad, Bareilly, Bijnor, Budaun, Sháhjahánpur, Bánda, introduced columns 14—17 include cash-rented land only. In all other districts they include cash-rented and grain-rented land.

† Figures for 1902-1903 have not been received owing to survey or settlement operations being in progress, hence figures for 1901-1902 have

‡ Figures for only a portion of the district are for 1902-1903, those for the remaining portions have been taken from previous

*statistics for* 1310 *fasli of Agra*—(concluded).

| statistics. | | | | | Collection. | | | | |
|---|---|---|---|---|---|---|---|---|---|
| land. | Total cash and grain-rented land. | | Siwai demand. | Total demand. | For current year. | For previous years. | Total. collection. | Percentage of total collection to demand. | Corrected rent-roll. |
| Rent. | Area. | Rent. | | | | | | | |
| 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 |
| Rs. | Acres. | Rs. | Rs. | Rs. | Rs. | Rs. | Rs. | | Rs. |
| 1,04,271 | 66,756 | 2,78,651 | 2,21,137 | 4,99,788 | 4,50,473 | 44,356 | 4,94,829 | 99 | 6,59,071 |
| 4,25,402 | 552,244 | 28,77,981 | 23,849 | 29,01,830 | 21,35,987 | 5,27,920 | 26,63,907 | 92 | 48,05,685 |
| 2,54,662 | 506,234 | 30,19,479 | 37,713 | 30,57,192 | 23,67,627 | 4,47,370 | 28,14,997 | 92 | 46,61,088 |
| 1,12,955 | 626,480 | 44,34,170 | 1,12,348 | 45,46,518 | 31,12,191 | 10,04,385 | 41,16,576 | 91 | 82,95,160 |
| 56,932 | 737,345 | 46,32,551 | 99,341 | 47,31,892 | 36,10,359 | 7,20,518 | 43,30,877 | 92 | 59,74,769 |
| 43,874 | 785,552 | 46,18,956 | 62,988 | 46,81,944 | 38,11,848 | 4,90,651 | 43,02,499 | 92 | 56,41,315 |
| 9,98,096 | 3,274,611 | 1,98,61,788 | 5,57,376 | 2,04,19,164 | 1,54,88,485 | 32,35,200 | 1,87,23,685 | 92 | 3,00,37,088 |
| 76 | 535,554 | 26,71,899 | 33,005 | 27,04,904 | 19,84,446 | 4,23,115 | 24,07,561 | 89 | 38,18,848 |
| ... | 683,287 | 33,07,875 | 33,995 | 33,41,870 | 24,59,532 | 6,25,727 | 30,85,259 | 92 | 41,23,251 |
| 6,477 | 547,485 | 22,22,559 | 22,111 | 22,44,670 | 14,35,410 | 4,16,799 | 18,52,209 | 83 | 27,47,879 |
| 6,778 | 523,015 | 24,09,220 | 22,196 | 24,31,416 | 17,33,117 | 5,24,103 | 22,57,220 | 93 | 29,50,887 |
| 2,809 | 495,857 | 25,65,129 | 27,309 | 25,92,438 | 20,66,980 | 3,74,235 | 24,41,215 | 94 | 31,09,199 |
| 11,491 | 609,785 | 23,39,757 | 43,153 | 23,82,910 | 16,33,651 | 5,12,873 | 21,46,524 | 90 | 28,61,567 |
| 27,631 | 3,394,983 | 1,55,16,439 | 1,81,769 | 1,56,98,208 | 1.13,13,136 | 28,76,852 | 1,41,89,988 | 90 | 1,96,11,631 |
| 3,89,626 | 746,734 | 33,31,874 | 98,211 | 34,30,085 | 27,00,660 | 4,07,186 | 31,07 846 | 91 | 37,33,163 |
| 6,35,067 | 595,519 | 31,71,012 | 30,634 | 32,01,646 | 22,59,283 | 6,24,172 | 28,83,455 | 90 | 39,84,406 |
| 41,366 | 853,911 | 30,51,646 | 17,154 | 30,68,800 | 23,45,149 | 4,65,374 | 28,10,523 | 92 | 36,33,015 |
| 9,23,967 | 1,021,591 | 41,48,045 | 80,894 | 42,28,939 | 33,55,583 | 5,51,347 | 39,06,930 | 92 | 47,51,824 |
| 9,626 | 696,629 | 24,11,092 | 91,710 | 25,02,802 | 16,85,940 | 3,25,191 | 20,11,131 | 80 | 28,82,040 |
| 4,07,287 | 390,818 | 14,10,281 | 73,773 | 14,84,054 | 10,18,552 | 2,50,434 | 12,68,986 | 86 | 15,77,548 |
| 24,06,939 | 4,305,202 | 1,75,23,950 | 3,92,376 | 1,79,16,326 | 1,33,65,167 | 26,23,704 | 1,59,88,871 | 89 | 2,05,61,996 |
| 95 | 751,562 | 38,32,090 | 70,981 | 39,03,071 | 30,21,754 | 5,16,277 | 35,38,031 | 91 | 45,83,354 |
| 3,035 | 485,584 | 22,45,875 | 64,625 | 23,10,500 | 19,31,799 | 2,12,407 | 21,44,206 | 93 | 29,51,493 |
| 253 | 714,421 | 16,56,502 | 66,300 | 17,22,802 | 14,03,647 | 1,15,486 | 15,19,133 | 88 | 24,61,596 |
| 4,957 | 570,528 | 13,34,625 | 21,320 | 13,55,945 | 11,49,781 | 57,888 | 12,07,669 | 89 | 20,00,653 |
| 4,110 | 998,694 | 43,03,616 | 39,034 | 43,42,650 | 30,83,346 | 9,10,514 | 39,93,860 | 92 | 52,81,460 |
| 1,486 | 583,450 | 8,98,515 | 26,246 | 9,24,761 | 7,95,135 | 41,617 | 8,36,752 | 90 | 14,09,976 |
| 61 | 371,819 | 12,42,437 | 11,882 | 12,54,319 | 10,08,476 | 1,50,711 | 11,59,187 | 92 | 18,85,265 |
| 13,997 | 4,476,058 | 1,55,13,660 | 3,00,388 | 1,58,14,048 | 1,23,93,938 | 20,04,900 | 1,43,98,838 | 91 | 2,05,73,797 |
| 22,652 | 333,859 | 14,69,524 | 6,624 | 14,76,148 | 6,76,720 | 5,82,909 | 12,59,629 | 85 | 19,62,695 |
| 61,790 | 550,850 | 14,43,256 | 24,077 | 14,67,333 | 8,57,402 | 4,32,761 | 12,90,163 | 88 | 20,35,839 |
| 33,783 | 517,827 | 23,62,923 | 5,806 | 23,68,729 | 13,65,570 | 5,71,464 | 19,37,034 | 82 | 31,70,351 |
| 30,320 | 441,670 | 19,02,356 | 10,579 | 19,12,935 | 10,01,748 | 4,97,952 | 14,99,700 | 78 | 28,78,758 |
| 39,054 | 426,840 | 16,95,732 | 18,150 | 17,13,882 | 8,21,326 | 2,99,056 | 11,20,382 | 65 | 24,55,733 |
| 1,87,599 | 2,271,046 | 88,73,791 | 65,236 | 89,39,027 | 47,22,766 | 23,84,142 | 71,06,908 | 80 | 1,25,03,376 |
| 4,863 | 1,597,406 | 46,00,501 | 2,15,664 | 48,16,165 | 44,38,773 | 2,29,754 | 46,68,527 | 97 | 65,01,467 |
| 84,802 | 859,269 | 33,97,787 | 52,449 | 34,50,236 | 33,09 590 | 41,847 | 33,51,437 | 97 | 52,25,060 |
| 62,593 | 504,579 | 25,71,634 | 15,491 | 25,87,125 | 21,72,940 | 2,93,886 | 24,66,826 | 95 | 44,41,937 |
| 1,52,258 | 2,961,254 | 1,05,69,922 | 2,83,604 | 1,08,53,526 | 99,21,303 | 5,65,487 | 1,04,86,790 | 97 | 1,61,68,464 |
| 83,595 | 181,925 | 3,98,276 | 21,586 | 4,19,862 | 3,64,757 | 26,094 | 3,90,851 | 93 | 4,42,432 |
| 38,70,115 | 20,865,079 | 8,82,57,826 | 18,02,335 | 9,00,60,161 | 6,75,69,552 | 1,37,16,379 | 8,12,85,931 | 90 | 11,98,98,784 |

Hamírpur, Jhánsi, Benares, Mirzapur, Jaunpur, Gházipur Ballia, Gorakhpur, and Basti where new forms of mauza registers have been
Columns 18 and 19 show for all districts cash-rented land only, and consequently are not the sum of columns 14, 16 and 15, 17.
been repeated.
years' returns.

*Statement showing classification of holdings and rental statistics for* 1310 *fasli of Oudh.*

| Districts. | Area of holdings. | | | | | | | Uncultivated land included in holdings. | Rent free and nominally rented area. (Columns 2 to 4.) |
|---|---|---|---|---|---|---|---|---|---|
| | Held as sír. | Held as Khúdkásht and Thekedar's cultivation. | Held without rent or free of rent. | Held by under-proprietors with under-proprietary rights. | Held by ex-proprietary and occupancy tenants. | Held by ordinary tenants. | Total area of holdings. (Columns 2 to 7.) | | |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| | Acres. | Acres. | Acres. | Acres. | Acres. | Acres. | Acres. | Acres. | Acres. |
| Lucknów ... | 12,472 | 28,373 | 23,711 | 12,257 | 4,323 | 310,240 | 386,376 | 18,065 | 59,556 |
| Unao ... | 55,856 | 37,146 | 48,025 | 13,183 | 4,746 | 522,814 | 681,770 | 29,088 | 141,027 |
| Rae Bareli ... | 25,852 | 19,817 | 52,326 | 29,054 | 9,440 | 504,538 | 641,027 | 42,330 | 97,995 |
| Sítápur ... | 22,757 | 49,902 | 57,922 | 3,513 | 3,413 | 935,267 | 1,072,774 | 44,621 | 130,581 |
| Hardoi * ... | 107,610 | 76,617 | 32,308 | 15,510 | 6,123 | 732,775 | 970,943 | 2,224 | 216,535 |
| Kheri ... | 20,580 | 27,059 | 70,897 | 10,687 | 10,583 | 785,322 | 925,128 | 65,779 | 118,536 |
| Total ... | 245,127 | 233,914 | 285,189 | 84,204 | 38,628 | 3,790,956 | 4,678,018 | 202,107 | 764,230 |
| Fyzabad ... | 51,223 | 51,620 | 35,907 | 92,182 | 20,832 | 481,315 | 733,079 | 41,038 | 138,750 |
| Gonda * ... | 45,919 | 239,358 | 24,156 | 59,305 | 12,421 | 815,661 | 1,196,820 | 86,503 | 309,433 |
| Bahraich ... | 5,324 | 49,434 | 8,244 | 9,397 | 1,920 | 977,611 | 1,051,930 | 64,834 | 63,002 |
| Sultánpur ... | 53,505 | 53,769 | 34,456 | 54,659 | 14,421 | 447,070 | 657,880 | 29,105 | 141,730 |
| Partábgarh ... | 28,407 | 31,165 | 29,935 | 32,799 | 23,694 | 402,092 | 548,092 | 34,901 | 89,507 |
| Bara Banki ... | 45,892 | 27,227 | 46,712 | 18,497 | 5,645 | 642,397 | 786,370 | 27,965 | 119,831 |
| Total ... | 230,270 | 452,573 | 179,410 | 266,839 | 78,933 | 3,766,146 | 4,974,171 | 284,346 | 862,253 |
| TOTAL, OUDH ... | 475,397 | 686,487 | 464,599 | 351,043 | 117,561 | 7,557,102 | 9,652,189 | 486,453 | 1,626,483 |

| Districts. | Rental statistics. | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Cash-rented land. | | | | | | Grain-rented land. | |
| | Under-proprietors, ex-proprietors and occupancy tenants. | | Ordinary tenants. | | Total. | | Area. | Rent. |
| | Area. | Rent. | Area. | Rent. | Area. | Rent. | | |
| 1 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 |
| | Acres. | Rs. | Acres. | Rs. | Acres. | Rs. | Acres. | Rs. |
| Lucknow ... | 16,580 | 60,787 | 291,112 | 20,29,884 | 307,692 | 20,90,671 | 19,128 | 76,963 |
| Unao ... | 17,929 | 67,750 | 511,870 | 29,59,230 | 529,799 | 30,26,980 | 10,944 | 49,741 |
| Rae Bareli ... | 38,494 | 1,45,227 | 483,086 | 31,33,794 | 521,580 | 32,79,021 | 21,452 | 66,123 |
| Sítápur ... | 5,587 | 13,276 | 499,974 | 31,34,994 | 505,561 | 31,48,270 | 436,632 | 19,67,453 |
| Hardoi * ... | 21,203 | 48,611 | 662,103 | 31,85,889 | 683,306 | 32,34,500 | 1,102 | 2,65,267 |
| Kheri ... | 20,826 | 38,053 | 503,677 | 20,57,632 | 524,503 | 20,95,685 | 282,089 | 9,65,666 |
| Total ... | ... | ... | ... | ... | 3,072,441 | 1,68,75,127 | 8,41,347 | 33,91,213 |
| Fyzabad ... | 113,014 | 3,25,038 | 470,427 | 26,15,944 | 583,441 | 29,40,982 | 10,888 | 18,250 |
| Gonda * ... | ... | ... | ... | ... | 664,589 | 27,88,800 | 222,798 | 7,17,950 |
| Bahraich ... | 11,317 | 14,594 | 576,181 | 25,93,200 | 587,498 | 26,07,794 | 401,430 | 15,73,288 |
| Sultánpur ... | 69,080 | 1,96,952 | 432,741 | 26,87,879 | 501,821 | 28,84,831 | 14,329 | 39,028 |
| Partábgarh ... | 56,493 | 1,76,506 | 395,143 | 26,21,899 | 451,636 | 27,98,405 | 6,949 | 21,411 |
| Bara Banki ... | 24,142 | 83,970 | 616,282 | 45,60,869 | 640,424 | 46,44,839 | 26,115 | 73,543 |
| Total ... | ... | ... | ... | ... | 3,429,409 | 1,86,65,651 | 682,509 | 24,43,470 |
| TOTAL, OUDH ... | ... | ... | ... | ... | 6,501,850 | 3,55,40,778 | 1,523,856 | 58,34,683 |

*Statement showing classification of holdings and rental statistics for* 1310 *fasli of Oudh.*

| Districts. | * Rental statistics—(*concluded*). | | | | Collection. | | | Percentage of total collection to demand. | Corrected rent-roll. |
|---|---|---|---|---|---|---|---|---|---|
| | Total cash and grain-rented land. | | Siwai demand. | Total demand. | For current year. | For previous years. | Total collection. | | |
| | Area. | Rent. | | | | | | | |
| 1 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 |
| | Acres. | Rs. | Rs. | Rs. | Rs. | Rs. | Rs. | | Rs. |
| Lucknow ... | 326,820 | 21,67,634 | 52,066 | 22,19,700 | 19,83,611 | 1,92,008 | 21,75,619 | 98 | 26,24,495 |
| Unao ... | 540,743 | 30,76,721 | 45,764 | 31,22,485 | 27,28,072 | 2,19,301 | 29,47,373 | 94 | 39,28,249 |
| Rae Bareli ... | 543,032 | 33,45,144 | 1,24,643 | 34,69,787 | 31,60,965 | 3,08,610 | 34,69,575 | 100 | 40,85,828 |
| Sítápur ... | 942,193 | 51,15,723 | 2,00,576 | 53,16,299 | 48,05,558 | 3,97,603 | 52,03,161 | 98 | 61,29,710 |
| Hardoi * ... | 754,408 | 34,99,767 | 45,039 | 35,44,806 | 30,56,304 | 2,94,209 | 33,50,513 | 95 | 50,03,034 |
| Kheri ... | 806,592 | 30,61,351 | 1,88,927 | 32,50,278 | 25,21,971 | 5,83,879 | 31,05,850 | 96 | 37,23,805 |
| Total ... | 3,913,788 | 2,02,66,340 | 6,57,015 | 2,09,23,355 | 1,82,56,481 | 19,95,610 | 2,02,52,091 | 97 | 2,54,95,121 |
| Fyzabad ... | 594,329 | 29,59,232 | 71,208 | 30,30,440 | 25,60,515 | 3,47,471 | 29,07,986 | 96 | 37,29,971 |
| Gonda * ... | 887,387 | 35,06,750 | 1,50,248 | 36,56,998 | 31,28,253 | 3,23,734 | 34,51,987 | 94 | 49,55,972 |
| Bahraich ... | 988,928 | 41,81,082 | 2,05,423 | 43,86,505 | 36,67,025 | 3,55,410 | 40,22,435 | 92 | 46,66,076 |
| Sultánpur ... | 516,150 | 29,23,859 | 35,008 | 29,58,867 | 24,63,228 | 3,60,788 | 28,24,016 | 95 | 37,73,814 |
| Partábgarh ... | 458,585 | 28,19,816 | 28,963 | 28,48,779 | 24,38,422 | 3,26,002 | 27,64,424 | 97 | 34,03,530 |
| Bara Banki ... | 666,539 | 47,18,382 | 67,717 | 47,86,099 | 44,87,162 | 2,63,374 | 47,50,536 | 99 | 56,55,498 |
| Total ... | 4,111,918 | 2,11,09,121 | 5,58,567 | 2,16,67,688 | 1,87,44,605 | 19,76,779 | 2,07,21,384 | 96 | 2,61,84,861 |
| TOTAL, OUDH ... | 8,025,706 | 4,13,75,461 | 12,15,582 | 4,25,91,043 | 3,70,01,086 | 39,72,389 | 4,09,73,475 | 98 | 5,16,79,982 |

* Figures for only a portion of the district are for 1902-1903; those for the remaining portions have been taken from previous years' returns.

# ORDERS OF GOVERNMENT.

No. $\frac{735}{\text{I}-\frac{237}{1904}}$ OF 1904.

## RESOLUTION.

REVENUE DEPARTMENT.

*Dated Allahabad, the 14th March 1904.*

READ—

Letter No. $\frac{947}{\text{VIII}-530}$, dated 16th January 1904, from the Director of Land Records and Agriculture, United Provinces, being his report on the operations of the department of Land Records and Agriculture for the year ending 30th September 1903.

Letter No. $\frac{62}{\text{VII}-47}$, dated 18th February 1904, from the Board of Revenue, United Provinces, forwarding the report with remarks.

OBSERVATIONS.—The most important branch of the work of the department is that which deals with land records. Under this head it is satisfactory to find that there has been a steady improvement. Further progress may be expected when the proposals referred to in paragraph 9 of the Director's report, which have already received the approval of this Government and only await the sanction of the Government of India, are finally adopted. Hitherto the weak point in the system has been the inadequate amount of the testing done by superior officers. To a large extent this was unavoidable, as the heavy case work which has to be got through during the camping season curtails the time which district officers can devote to executive duties. A remedy is, however, now being found in some districts by strengthening the staff during the cold weather, and in others by placing assistant collectors on special duty. The nature and quality of the work done by the Director's inspectors are not described in the report; but there is reason to believe that the inspection reports submitted by these officers, though less diffuse than they used to be, are not of much assistance to collectors.

2. The recovery of cultivation in Bundelkhand and in Hardoi—tracts which suffered severely during the recent scarcity—is gratifying. The changes in the form of the statements of holdings and rental statistics render any detailed comparison with the returns of preceding years impossible. The lowness of the percentage of recorded rent collections in the Benares division is largely due to the figures for the Ballia district, in which less than two-thirds of the demand is reported to have been collected. Dissensions between landlord and tenant in the large Dumraon estate must have contributed to this result; but it is probable that the record of payments is less complete than elsewhere. Making every allowance for these factors, however, there can be no doubt that throughout a considerable portion of that division the standard of collection is below the provincial average. In Rae Bareli alone is the full demand shown as realized; but in that district rent is, it is believed, paid to some extent from service earnings.

3. In regard to assistance given by the department to the public, the best work done has been in the distribution of selected seed and in the supply of trained men for conducting trial borings for wells. Under these heads the demands on the department are bound to increase as the advantages of the system become better known. The transfer of the control of the Meerut demonstration farm to the department, and the alteration in the method of working, should be beneficial. A district board cannot efficiently manage an experimental farm. His Honour agrees with the Director that the agricultural class attached to the Moradabad normal school is, under present conditions, serving no useful purpose.

4. The acknowledgments of Government are due to Mr. Moreland, and the officers who acted for him while on leave, for the efficient administration of the department during the year.

---

ORDER.—Ordered that a copy of the above resolution be forwarded to the Director of Land Records and Agriculture, United Provinces, for information.

Ordered also that a copy be forwarded to the Secretary to the Board of Revenue, United Provinces, for the information of the Board.

By order, &c.,

L. A. S. PORTER,

*Chief Secy. to Govt., United Provinces.*

# REPORT

ON THE

# Operations of the Dept. of Land Records & Agriculture,

## UNITED PROVINCES OF AGRA AND OUDH.

**FOR THE YEAR ENDING 30th SEPTEMBER 1904.**

*ALLAHABAD:*

**Printed at the United Provinces Government Press.**

1905.

[Prescribed maximum limit of the report 25 pages, excluding tabular statements.]

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# REPORT

ON THE

# Operations of the Department of Land Records and Agriculture,

## UNITED PROVINCES,

***FOR THE YEAR ENDING THE 30TH SEPTEMBER 1904.***

No. $\frac{565}{\text{VIII—548}}$.

FROM

W. H. MORELAND, ESQ., C.I.E., I.C.S.,

DIRECTOR, DEPARTMENT OF LAND RECORDS AND AGRICULTURE,

UNITED PROVINCES,

To

THE CHIEF SECRETARY TO GOVERNMENT,

UNITED PROVINCES,

REVENUE DEPARTMENT.

*Dated Lucknow, the 23rd January* 1905.

SIR,

I HAVE the honour to submit the annual report on the administration of this department for the year ending the 30th September 1904. This report does not profess to cover the whole activity of the department. The record of the economic facts of the year will be found in the Season and Crop Report, the reports on Inland and on Foreign Trade, and the forecasts and reports on particular crops; the experiments and investigations pursued during the year are dealt with in the Report on the Cawnpore Farm and other Experiment Stations; the remaining functions of the department form the subject of this report. This preliminary explanation is inserted in accordance with G. O. No. 1701/I—497/1904, dated 23rd June 1904. Under the same orders I have omitted from the report the appendix dealing with the classification of holdings and rentals, and the discussion of those figures which last year appeared as part (III) of Chapter II. This subject will be dealt with in the Administration Report of the Board of Revenue.

## CHAPTER I.

### PREFATORY.

Charge of the Department.

2. I was in charge of the department throughout the year. The Deputy Director, Mr. J. M. Hayman, returned from leave on 22nd November 1903, while the Assistant Director, Saiyid Muhammad Hadi, M.R.A.C., M.R.A.S., proceeded on privilege leave on 18th August 1904; for the rest of the year these officers held their respective posts. Mir Saiyid Husain, who was appointed to the executive branch of the provincial civil service on 1st December 1903, was my Personal Assistant throughout the year.

Tours of officers.

3. In October 1903 I visited the normal school farm at Moradabad, and the botanical gardens at Saháranpur. The rest of the month, with the first half of November, was occupied in departmental work at Cawnpore and in the vicinity, including the instruction of the Assistant Collectors detailed for land records duty, and the class for probationary Deputy Collectors. I joined my camp at Soron on 17th November and inspected the districts of Budaun, Bareilly, Pilibhít, Moradabad and Bijnor, and the headquarters of Saháranpur. Leaving my camp at the end of January, I went to Aligarh to inspect the land records and the *usar* experiment station, and to hold a conference on industrial training with the merchants of Háthras and neighbouring towns. In February I inspected the headquarters land records in Lucknow and the agricultural work in progress in Jalaun. In March and April I inspected land records in Allahabad, Fatehpur, Hamírpur, Etáwah, Fyzabad, Sultánpur and Bara Banki. During my rains tour I inspected land records and other departmental work in Allahabad, Jaunpur, Azamgarh, Ballia, Gházipur, Benares, Fyzabad, Unao and Sháhjahánpur.

4. The principal part of the Deputy Director's touring was spent in selecting young bulls for future distribution in Bundelkhand, and in choosing a site for the bull depôt in the Bánda district. Later he visited the Tamkohi wards estate in Gorakhpur to report on the advisability of starting a home farm ; and at different times he inspected the experiments in progress in the Jalaun district.

5. The Assistant Director spent the first three months of the year mainly in seed distribution among the Oudh districts, but during this period he also attended the cattle shows at Lakhimpur, Karwi and Karma. From January to the middle of May he was engaged first in experimenting with, and then in demonstrating, the improved sugar-factory which he has designed ; he also attended the Sultánpur agricultural show, examined the agricultural class at the Moradabad normal school, and made such departmental inspections as were required. The seed depôts then claimed his attention until the end of July, after which he inspected the Meerut farm and the Abbaspur *usar* station, and before proceeding on leave visited Rámpur to advise the state officials regarding the establishment of a dairy.

6. During the field season Captain W. M. Coldstream, Superintendent of provincial surveys, conducted a survey class for junior civilians, inspected the cadastral work and survey offices in Moradabad, Hamírpur and Bánda, checked the topographical surveys of the beds of the Ganges and Rámganga in Meerut, Bulandshahr and Budaun, and inspected and reported on the maps of the riverain area in Ballia. During the rains he again inspected all survey offices and checked surveys in Lucknow and Agra.

Special features of the year's work.

7. Important changes were made during the year in the organization of the staff of the department. The Assistant Director and my Personal Assistant were graded as members of the executive branch of the provincial civil service, thus giving both officers a prospect of promotion ; the clerical staff was regraded on a more favourable scale, (which will come into full effect next April); and the executive agricultural staff was so reorganized as to offer regular promotion and to provide for training young men as managers of farms. The appointment of an Economic Botanist was decided on during the year, and an even more important step was the decision to appoint a Registrar of co-operative credit societies ; the latter officer is not actually on the staff of the department but he will naturally work in close touch with the Director. The Superintendent of the civil veterinary department, relieved of his duties under the Imperial Government, was brought into closer relation with the department, a change which has abolished a mass of useless correspondence and increased the efficiency of both offices.

8. There is no new departure to chronicle on the land records side of the department. I had hoped that the proposals for strengthening the local staff, mentioned in last year's report, would have been introduced during the year, but I understand that they are still before the Government of India.

9. On the agricultural side activity has increased in various directions but mainly on the lines followed in former years. The development of the agricultural school has however been decided on : with better buildings and equipment, and a larger and more highly qualified staff, the school will soon be in a position to offer a sound training not only to officials but also to landholders and land agents. General approval has been given to the proposal to establish an experiment station in Bundelkhand, where the extension of canal irrigation among cultivators many of whom are acquainted only with dry-cropping involves the necessity of both study and demonstration.

## CHAPTER II.

### (I) Land Records.

Establishment.

10. During the year under report the appointment of an additional inspector of kanúngos received the sanction of Government. Five assistant registrar kanúngos were sanctioned for Basti and Gházipur, and seven assistant teachers were added to the patwári school establishments in Aligarh, Pilibhit, Jalaun, Mirzapur, Ghazipur, Unao and Bara Banki. Since the close of the year, a teacher has been sanctioned for a separate school at Meja in Allahabad. The number of patwáris rose by 121, as the net result of the revision operations enumerated below. The proposals mentioned in last year's report for raising the number of supervisors, grading the sadr kanúngos

and giving the latter a competent office establishment have received the general approval of Government : formal sanction to the proposed changes in the staff and pay has been applied for and the orders of the Government of India are awaited.

Revision of circles.

11. In Agra, schemes for the districts of Meerut, Aligarh, Farrukhabad, Etáwah, Bareilly, Bijnor and Sháhjahánpur were sanctioned and introduced during the year ; a scheme for Gházipur has been submitted, and one for Pilibhít is under examination. Proposals have also been submitted, (*i*), for introducing the final scales sanctioned many years ago for the districts of Jaunpur, Ballia, Mirzapur and Gorakhpur, but hitherto held over for want of funds ; and, (*ii*), for raising the pay of the lowest grade of patwáris and of the assistants of all districts except a few which are under settlement, and for which these changes will be included in the reallocation schemes. No important changes have been made in Oudh.

12. The question of introducing the system of personal pay in the Agra districts has been raised by several officers during the year. This system has now been the rule for some time in Oudh, and so far it has worked well where it has been worked carefully : the Deputy Commissioner of Fyzabad while giving a detailed account of its working concludes that on the whole a fair flow of promotion is secured by its means. Enquiries made in Agra showed that the pay of patwáris in the Naini Tál Government estates was already sanctioned as personal, and that the system had been introduced in Saháranpur and Cawnpore without due authority. Government sanction to its maintenance in these districts has been obtained, and the system has also been extended to Basti, as part of the special measures taken to improve the records in that district. Its extension to the rest of Agra awaits further experience of its working in the districts where it has been introduced.

Promotion of kanúngos.

13. During the past year one sadr kanúngo was appointed a tahsíldár, 17 kanúngos received temporary promotion as naib tahsíldárs, and three were made permanent in the same post. Four kanúngos were selected as approved candidates for naib tahsíldárships.

Promotion of patwáris.

14. Sixteen patwaris were permanently promoted to higher posts in the district establishment, while some others received temporary promotion. Four patwáris were exempted from the educational test under the authority delegated to me by Government.

Education of patwáris.

15. The percentage of passed patwáris has risen from 90 to 91 and that of exempted ones has fallen from 6 to 5. The balance of 4 per cent. consists almost entirely of posts temporarily vacant and of heirs appointed conditionally under the rules. The only district where unpassed men, other than heirs, are numerous is Azamgarh where the long-continued record and settlement operations have interfered with the working of the school. There are also a few unpassed men in Allahabad : it is difficult to get qualified men to serve in the country south of the Jumna, and the opening of a separate school for this tract, at Meja has recently been sanctioned by Government.

16. A text book in arithmetic, prepared by B. Ram Ratan Lal, Deputy Collector, in accordance with the syllabus drawn up by the Superintendent of provincial surveys and myself, has been prescribed for use in the patwári schools : a text book in mensuration is also under preparation. The good conduct allowance of one teacher was increased, and another received an allowance during the year.

17. As was mentioned in last year's report, I have placed an expert surveyor on my inspection staff, and employed him mainly in examining the teaching of survey and map work in these schools. His inspections have brought to light numerous defects in the methods of teaching, and I consider the appointment amply justified by the results.

Residence of patwáris.

18. The important subject of residence has received due attention in nearly all districts. In Agra exemptions have generally decreased, but a large increase has been reported from Budaun the cause of which has been enquired. It is no use discussing in detail the fluctuations in the numbers returned as resident and as absentees, since an increase in the latter often indicates not an increase in absenteeism but a closer administration.

In Oudh large numbers of patwáris have now settled in the new circles assigned to them at the recent reallocation, and for the province as a whole almost four patwáris out of five appear to be actually resident in their circles.

19. Loans aggregating Rs. 7,156 have been sanctioned in twelve districts to enable patwáris to meet the cost of building houses in their circles : the conditions on which these loans were given were very carefully drawn to prevent the possibility of demoralization, and it was made clear that they were given purely as a temporary expedient, and not as part of a permanent system.

Filing of patwaris' papers.

20. The high standard of punctuality reached in the preceding year has been fully maintained. Ninety-five and a half per cent. of the area statements, 92 per cent. of the crop statements and 89 per cent. of the rental statements were filed in time as compared with 95, 89 and 89 per cent. respectively in the preceding year. Of the districts where defective work was noticed last year, filing has greatly improved in Bijnor, and some improvement is noticeable in the remainder. The delay in tahsíl Nighásan of the Kheri district is explained to be due to the difficulty experienced in filling vacant patwáriships, and the Deputy Commissioner writes that he is raising the status of some of the village schools, so that trained men used to the climate may in time become available. The district in which there was the greatest unexplained delay is Farrukhabad. In the whole provinces only 4,431 papers were more than a month late : of these 4,348 belonged to districts under settlement, and the remaining 83 to six other districts.

Testing of patwaris' papers by supervisors.

21. The amount of testing done by supervisors exceeded the prescribed minimum in all districts except Moradabad, Cawnpore and Jhánsi, where it fell short owing to interference caused by survey or settlement operations. The value of their test will be considered further on in the light of the results obtained by superior officers.

Testing by superior officers.

22. The amount of testing done by officers on the headquarters staff was usually sufficient : it was however altogether inadequate in Muttra, Agra, Naini Tál, Lucknow and Kheri, while the rent rolls received insufficient attention in Bareilly, Bijnor, Sháhjahánpur, Pilibhít and Benares, and the khewats were somewhat neglected in Aligarh, Bijnor, Sháhjahánpur and Pilibhít. In Bijnor excessive case-work is stated to account for the defect : from the other districts no adequate explanation has reached me. The Deputy Commissioner of Kheri writes that it will be impossible for the Deputy Collectors to do more this season as the reduction of the district contract grant involves curtailment of the period they can spend on tour. The Collector of Pilibhít remarks that the addition of a third Deputy Collector to his staff would make it possible to secure better results. I am not in a position to estimate the true weight of these remarks, but it is certainly the case that in districts where the population is small relatively to the area, a touring staff that is adequate to the needs of the population generally may be insufficient to give the necessary attention to the records. With a larger area to cover in a limited time, marches must be longer and halts fewer, and I know from personal experience the influence that these conditions exert.

23. Once again I find it necessary to report that in several districts, which are noted on the margin, the time of the headquarters staff was not utilized to the best advantage, being devoted to patwaris' work to the neglect of the supervisors. It follows that in these districts the Collector has not received sufficient information regarding the value of the supervisors' work to enable him to exercise effective control. Of these districts Muttra, Bijnor, Allahabad, Lucknow, Gonda and Partábgarh appeared also in the list given in last year's report.

| | |
|---|---|
| Muttra. | Naini Tál. |
| Agra. | Lucknow. |
| Bijnor. | Kheri. |
| Pilibhít. | Fyzabad. |
| Cawnpore. | Gonda. |
| Allahabad. | Bahraich. |
| Gorakhpur. | Sultánpur. |
| Partábgarh. | |

24. Tahsíldárs, who with the assistance of their naibs are required to test the work of every circle once in three years, have as a rule complied with these orders and have done an adequate amount of work. Shortcomings in Muzaffarnagar have attracted the Collector's attention.

25. The sadr kanúngos have, as a rule, done a sufficient amount of work : any defects that have been noticed in their returns have been pointed out to them

at the time. One sadr kanúngo was removed from his post at my instance, and I have had to warn one or two others. On the other hand I am glad to notice that district officers commend the work of the sadr kanúngos in Bulandshahr, Muttra, Allahabad, Basti, Bara Banki, Moradabad, Gonda, Sháhjahánpur, Rae Bareli and Unao; and I can confirm most of these commendations from recent personal knowledge.

26. Having now indicated the extent to which the records have been watched by superior officers, I may return to the question of the value of the supervisor kanungos' work. I need hardly say that the accuracy of the records depends principally on the supervisor: a careful supervisor can get fairly good records out of bad patwáris while a bad supervisor can get good records only by accident. Where superior officers find a considerable number of mistakes in entries already tested by the supervisor, the only conclusion that can be drawn is that the supervisor has worked carelessly: and where few or no mistakes are detected the contrary inference can be drawn provided that the superior test was thorough, but the proviso is important. I need not in this place go into the details of districts which judged by this criterion have bad supervisors; in these cases I have brought the matter directly to the notice of the district officer. But speaking generally there is no district where I can say confidently that all the supervisors are good; and there are several districts where many of them are bad. There is thus no prospect that the attention of superior officers can safely be relaxed: on the contrary the records claim even more attention than they receive. And it is also necessary that attention should be distributed over all the records: I frequently come across cases where the supervisor has tested carefully the khasra and the khewat, which he knows may come under the eye of officers in camp, but has entirely shirked his test of the later or derivative records, the khatauni and jamabandi, which should be tested by him after the touring season is over. He knows by experience that the chance of his work on these records being examined by any one else is very small: the examination is tedious office-work, and the papers themselves are thought to be ancient history before the next touring season comes round. The neglect of these records however accounts for a very large proportion of the inaccuracies that make litigation so burthensome, and it must be checked in some way. I think it is most important that the district staff should continue to give most of the limited time available to supervising the first-hand record of facts that can be ascertained on the spot, that is to say the facts recorded in the khasra, the khewat and the siaha: but it is also important that these facts should be correctly entered in the ultimate records, the khatauni and the jamabandi, which are ordinarily referred to in court. The second check of these records is mechanical, and can be done satisfactorily by a competent sadr kanúngo, but it must be done by some one or the supervisor will neglect his work and the records will be wrong. If the sadr kanúngo's office is strengthened in accordance with the proposals before Government, I shall insist on a fair proportion of the time so made available being devoted to the check of these derivative records, and after a short experience it will be possible to say whether this measure is sufficient, or whether other means of supervision must be devised.

Value of the supervisors' test.

27. Assistant Collectors were posted for the cold weather to four districts, Bulandshahr, Rae Bareli, Basti and Sháhjahánpur, where work was known to be defective. The officers selected were Mr. G. C. Badhwar, Mr. E. F. Oppenheim, Mr. G. F. Adams and Mr. F. F. Sladen. I am glad to be able to report that all these officers fully justified their selection, and that as the result of their efforts the staff of each district has been shaken out of the rut of inefficiency, and made to realise the need of accuracy and thoroughness. I must commend in particular the work of Mr. Adams in Basti, the largest and most troublesome of the four districts.

28. I have recently inspected parts of Unao and Rae Bareli, which have been overhauled by Assistant Collectors during the last two years, and as the result of my observations I may express the confident opinion that this system is the greatest advance towards securing good work that has been made since I have been Director; and I may say this the more freely because the system was not originated by me. The districts of Aligarh, Etáwah and Allahabad have been selected to be overhauled the present year.

29. One great difficulty in maintaining accurate records is to get the staff to work after a settlement is over. For one thing, the machine is not in working order: new rules have issued: forms have changed: and the kanúngos in particular are slow in returning to their regular routine. For another thing, it has been the

practice to try and get complete records from the patwáris, no matter at what period of the year they might return to work. This has led to bad records compiled in a hurry, and the arrears have delayed the next year's work so that the errors have tended to perpetuate themselves. This second cause of bad records has I trust been done away with by instructions issued during the year (with the sanction of the Board), which lay down the records to be prepared where patwáris return to work in the middle of a year. But the first cause, the slowness of the staff to return to the regular routine, can be dealt with only by the close supervision of the district officer. This point is likely to be of special importance in Azamgarh where the break caused by survey and settlement operations has been unusually prolonged; and I am glad to be able to record the decision to strengthen the Collector's staff by the deputation of a deputy collector who will be responsible for starting the work as the patwáris leave the settlement office, and for supervising the staff until the regular system is in working order.

Maintenance of boundary marks.

30. The prescribed procedure for the inspection of boundary marks was followed in all districts except a few under survey or settlement, and necessary action was taken for repair or replacement by stone pillars. Satisfactory progress in this direction is noticeable in Budaun where the marks had been neglected for years. At present the circular (No. 17-VII) which deals with this subject prescribes the principles to be followed, but the actual procedure is governed partly by circular letters issued by the Board in other departments, and partly by district customs: it is usually exceedingly cumbrous and a source of unnecessary annoyance to landholders. I am arranging to bring together all the rules and orders into a workable code, and at the same time to lay down a more satisfactory method of procedure.

Map correction.

31. In Agra the great majority of the maps are reported to be maintained without much difficulty, which is experienced only in alluvial tracts or where the cultivation fluctuates. Last year defects were noticed in Basti and Allahabad. The defect in the former district was part of the general slackness: the supervisors have now reported the maps to be up to date, and the accuracy of their reports is being checked. In Allahabad the maps, especially those of the trans-Jumna tract, received particular attention during the year and considerable progress has been made: in a few cases the correction was done by special agency as provided by the rules. The work in Gorakhpur is reported to be generally backward and will, I trust, receive the Collector's attention. The question of map maintenance in the *halbandi* villages of Domariaganj in Basti is under the consideration of the Collector; an even more troublesome question, the maintenance of maps of the alluvial villages of the Ballia district, was investigated last cold weather by the Superintendent of provincial surveys and a report on the subject submitted to the Board.

32. In Oudh, all the maps were corrected in Fyzabad and Partábgarh while only four each remained in Sultánpur and Lucknow, 24 in Bahraich and 43 in Unao. The general condition of the maps is reported to be satisfactory in Gonda and much improvement is noticeable in Rae Bareli. In Kheri the arrears in tahsíl Nighásan have drawn the attention of the Deputy Commissioner who hopes to secure better results this year. In Hardoi the maps of tahsíl Sháhabad and of 491 villages of the other three tahsíls have fallen behind in the course of the long-continued settlement operations: the matter is receiving the Deputy Commissioner's special attention. In Sitapur, 850 out of the 1,184 maps which had been classed as capable of correction in the ordinary way were brought up to date. As regards the correction of the remainder it has been decided by the Board that in villages where the cultivation is shifting the maps must be left alone, while in cases where the illegibility of the maps is due to the large extension of permanent cultivation, the maps must be carefully corrected under the control of the supervisors and then traced by a special staff; the traces so made will be maintained by patwáris under the ordinary rules. All the maps of Bara Banki were corrected except those of pargana Bhitauli and of 20 villages in other parganas: the case of Bhitauli is similar to that of Sítapur, and the Deputy Commissioner has been consulted as to the possibility of treating the maps in the manner indicated above.

Concealment of rents.

33. Cases of concealment of assets are reported from sixteen districts but they disclose no novel features. Besides Agra, Etáwah, Fatehpur, Basti and Gorakhpur where the number of

such cases was again large, many instances of concealment were found in pargana Sagri of Azamgarh by the Settlement Officer, and in Rae Bareli by the Assistant Collector on land records duty. Measures were taken this year to get the real rents entered in the Kasia subdivision of Gorakhpur and the rent-rolls show an increase of almost a lakh of rupees as the result of this attestation. In Basti the jamabandis were found to be quite out of date, as no real attempt had been made to maintain them since the settlement. A beginning was made in recording the facts during the past year, and the matter will now receive the special attention of the Collector. The difficulty noticed in last year's report regarding the entry of rent which is collected though not legally payable has been discussed at some length during the year, and it has been decided to subdivide the rental column in the khatauni so as to show both the rent legally payable and the excess demand.

Preparation and maintenance of tahsíl registers.

34. The preparation of tahsíl registers is in progress in the settlement offices of Etah, Mainpuri and Azamgarh, and the necessary instructions have been issued to the settlement officers of Dehra Dún, Cawnpore and Jalaun. The question of preparing fresh registers for Naini Tál has been under consideration during the year. The new registers of Gházipur and Jaunpur are being prepared by my special staff: those for Muttra and Etáwah have been completed; in Jaunpur work has been finished since the close of the year and the staff has been moved to Allahabad.

35. All the pargana hand books of Aligarh, Farrukhabad, Bijnor and Hardoi were published during the year. The remaining hand books of Bareilly and Gonda were also issued.

36. As regards maintenance, the registers are, as a rule, up to date and some district officers report that they are accurate. Several reports are, however, silent on the important question of accuracy. Special attention continues to be devoted to this point during the inspections made by myself and by my staff of inspectors.

37. The use of the registers is gradually becoming established as part of the regular district routine. In a time of prosperity such as we have recently enjoyed there is often little in the registers to call for notice; but the habit of using them will be a solid gain when the lean years come upon the province.

Director's inspections.

38. The districts which I visited are enumerated in an earlier chapter, and they need not be recapitulated here. My winter tour in Rohilkhand brought home to me forcibly the practical evils that result from neglect of the khatauni and jamabandi, and has, I think, been of substantial benefit to the records in the districts I visited. The rest of my tour calls for no special remarks, as it was devoted to uninteresting but necessary routine inspections.

39. Along with my own inspections may be classed those of my inspecting staff. As now organized the staff includes six officers, of whom one is a surveyor employed as patwári school inspector, and another is for the most part attached to my camp for training. The remaining four are employed mainly in the systematic inspection of district routine, their most important function being to see that due care is exercised in those routine branches of work which usually escape the attention of officers of the district staff: thus they are required to make sure that the registers are accurately compiled, that the statistics are correctly totalled, that the khasras are properly compared, and the khataunis and jamabandis duly compiled from the records on which they are supposed to be founded, and so on. Their inspections therefore supplement, but cannot replace or conflict with, those of the district staff, and Collectors of experience have expressed their appreciation of the value of the detailed reports which are sent to them for action. I should add that each report is examined by me before it is transmitted to the Collector, and that in forwarding it I note what points require his personal attention and what may safely be left to his office to put right. I also endeavour so to arrange my tours as to verify some portion of the work of each inspector in turn: these precautions are obviously necessary.

Amendment of rules.

40. Some amendments have been made during the year in the rules regarding appointment, punishment, etc., of patwáris and kanúngos and the duties of sadr kanúngos, and a few other changes have been made in detail. Revised rules have also been issued laying down definitely the patwáris' duties in connection with the record of the accrual of occupancy rights in Agra. The draft rules for kanúngos and patwáris in the Bhábar have been submitted to the Board of Revenue.

State of the patwári funds.

41. The surplus for the year amounted to Rs. 1,64,110 and the sum at credit of the funds rose to Rs. 6,60,859. Detailed proposals for utilizing the greater portion of the annual surplus have been submitted as has been mentioned above. As regards the accumulated balance, Government has accepted my proposal that it should be drawn on for non-recurring expenditure, and that in addition a small deficit may for the present be budgeted for on account of recurring charges.

## (II).—Surveys and revision of records.

42. During the year cadastral operations, accompanied by the revision or partial revision of records, have been in progress in Moradabad, Hamírpur and Banda, and traverse surveys for cadastral purposes in Moradabad.

43. *Moradabad Traverse* (*Mr. F. S. Bell, in charge*).—In Moradabad 269 square miles were traversed for cadastral purposes at a cost of Rs. 25-5-0 per square mile, or, if a share of headquarter charges of the provincial surveys is included, Rs. 29-15-9 per square mile; and 114 linear miles of main circuit were run in advance along the high bank of the Ganges at a cost of Rs. 8 per linear mile. These rates are rather lower than the corresponding rates of last year. The work was connected with three stations of the great trigonometrical survey, the errors so disclosed being 2·9 and 3·2 linear feet per mile. An area of 315 square miles in the alluvial tracts of the Ganges remains for detailed traverse next year. The necessity for traversing such tracts during the same year as that of cadastral survey limits the outturn and tends to raise the cost rates.

44. *Moradabad Cadastral* (*Mr. L. F. Berkeley, in charge*).—Cadastral operations commenced in Moradabad in October 1903, and included an area of 593 square miles. Of this, 507 square miles consisting of the alluvial tracts in Amroha, Moradabad and Thakurdwara tahsíls were surveyed, and the maps of 86 square miles in the sandy tracts of Amroha were revised and corrected. Preliminary records-of-rights were written for 527 square miles. A small area of 20 square miles, part of an addition made to the programme late in the season, was also traversed by the local cadastral section. The cost rates were Rs. 43-0-2 per square mile for cadastral work, and Rs. 16-1-7 per square mile for record writing; or, if a share of the headquarter charges of the provincial surveys are included, Rs. 46-13-7 and Rs. 17-9-3 respectively, and Rs. 16-4-8 per square mile for traverse. The maps were tested by an average of 5 linear miles of check survey, and 20 per cent. of the khasra entries were examined and checked on the ground. The average size of fields was 0·7 of an acre, and the quality and cost rates of the work may be considered satisfactory. Of the 270 patwáris 203 proved competent to survey their villages, 39 were allowed to provide their heirs to do the work, and substitutes had to be appointed for the survey work of 28, the records being written by the patwáris themselves. An area of 250 square miles of map correction in Amroha, Hasanpur, and Sambhal tahsíls, and of 315 square miles of survey in Hasanpur, remains for survey in 1904-1905; and operations will close in the district in November 1905.

45. *Bánda.* (*Mr. F. B. Powell, in charge*).—Operations in Bánda commenced in October 1903, and consisted in the revision and correction of the cadastral maps of Bánda and Pailáni tahsíls, with the preparation of annual patwári records. As was foreseen when the operations were sanctioned, a considerable number of villages had to be entirely re-surveyed, as the changes were too numerous to deal with by correction, and this was carried out on plots of the old traverse data of 1871—77, the old stations being found permanently marked with very few exceptions. The total area of survey and map correction was 789 square miles, and that for which records were written 754 square miles. The difference is due to the large number of incompetent patwáris and the difficulty experienced in procuring local substitutes; it will not delay the sanctioned programme of operations, which prescribes the 1st of November as the date for completion. On an average 3·84 linear miles of check survey per square mile have been run through the work, and 27 per cent. of the khasra entries checked on the ground. Of 207 patwáris 146 proved competent, 28 were allowed to provide their heirs to do the work, and substitutes had to be provided for 33. The cost rates are Rs. 27-8-6 per square mile for cadastral correction and resurvey, and Rs. 9-2-8 per square mile for record writing; or if a share of the headquarter charges of the provincial survey are included, Rs. 30-6-8 and Rs. 10-9-9 respectively. The corrected maps hav

been traced for reproduction by the Vandyk process and will be printed within the next few months. Operations will close in this district in November 1907.

46. *Hamírpur. (Mr. P. C. H. Smart, in charge).*—Operations were commenced in Hamírpur in October 1903, and were similar to those carried out in Bánda. The survey and map correction of parganas Hamírpur, Sumerpur, and Maudaha, 613 square miles, were completed during the year and annual records were written for the same area. The amount of re-survey required was about the same as in Bánda, and the cost rates are rather higher, being Rs. 36-12-4 for cadastral work and Rs. 12-4-0 for record writing : or if a share of the headquarter charges of the provincial surveys are included, Rs. 40-7-10 and Rs. 13-7-10 respectively. The higher cost rates are accounted for by the greater difficulty of the work caused by the obliteration of almost all the old traverse stations. This necessitated the temporary fixing of a large number of auxiliary stations from the trijunction marks, which fortunately were generally found well marked. The maps were tested by an average of 2·8 linear miles of check survey, and 24 per cent. of khasra entries were checked on the spot. Of 163 patwáris, 136 proved competent, 16 were allowed to produce heirs for employment in survey, and substitutes had to be provided for 11. Operations close in this district in November 1906.

47. The total expenditure on cadastral operations and on the headquarter section of the provincial surveys during the year has been Rs. 1,20,392; of this Rs. 34,056 was spent in Moradabad, Rs. 28,960 in Bánda, Rs. 30,054 in Hamírpur, Rs. 22,783 on headquarter charges, and Rs. 4,539 on completing the maps and records of Mainpuri and Jalaun.

48. Settlement officers were as usual invited to express an opinion on the quality of maps and records prepared by the survey establishment. They have as a rule found the work satisfactory : where errors have been found orders have issued to prevent their recurrence in the districts now in hand. The following tabular statement of the work in progress is given in accordance with the correspondence ending with G. O. No. 1701/I—407/1904, dated 23rd June 1904 :—

| District. | Date of commencement of cadastral operations. | Work done during the year. | Expenditure during the year. | Cost rates per square mile of the year. Survey. | Cost rates per square mile of the year. Record writing. | Remaining for future years. |
|---|---|---|---|---|---|---|
| | | | Rs. | Rs. a. p | Rs. a. p. | 1904-05. |
| Moradabad | 1st October 1903. | Completion of survey and rough records of— | 34,056 | 43 0 2 | 16 1 7 | Survey and preliminary record writing of Hasanpur :— |
| | | Tahsíl Thakurdwara, 242·02 Sq. m. | | | | Resurvey ... ... 315 Sq. m. |
| | | Alluvial tracts, Moradabad ... ... 127·91 „ | | | | Map correction ... 228 „ |
| | | Commencement (on 2 years' system) of survey and rough records of bhúr tracts of Amroha :— | | | | Map correction and preliminary record writing, bhúr tracts :— |
| | | New survey ... 137·79 „ | | | | Sambhal ... ... 60 „ |
| | | Map correction ... 86·09 „ | | | | Total ... 603 „ |
| | | Total ... 593·8 „ | | | | Completion on 2 years' system of bhúr tracts of Amroha about ... 200 „ |
| | | | | | | 1904-05. |
| Bánda ... | 1st October 1903. | Map correction and preparation of modified annual records :— | 28,960 | 27 8 6 | 9 2 8 | Baberu ... ... 363 „ |
| | | Bánda ... ... 427 „ | | | | Kamasin ... ... 358 „ |
| | | Pailáni ... ... 362 „ | | | | Total ... 721 „ |
| | | Total ... 789 | | | | 1905-06. |
| | | | | | | Badausa ... ... 332 „ |
| | | | | | | Girwan ... ... 334 „ |
| | | | | | | Total ... 666 „ |
| | | | | | | 1906-07. |
| | | | | | | Mau ... ... 317 „ |
| | | | | | | Karwi ... ... 567 „ |
| | | | | | | Total ... 884 „ |
| | | | | | | 1904-05. |
| Hamírpur. | 1st October 1903. | Map correction and preparation of modified annual records :— | 30,054 | 36 12 4 | 12 4 0 | Jalalpur ... ... 188 „ |
| | | Hamírpur ... 135 „ | | | | Rath ... ... 384 „ |
| | | Sumerpur ... 244 „ | | | | Maskara ... ... 222 „ |
| | | Maudaha ... 234 „ | | | | Total ... 794 „ |
| | | Total ... 613 | | | | 1905-06. |
| | | | | | | Panwari and Jaitpur ... 559 „ |
| | | | | | | Mahoba ... ... 329 „ |
| | | | | | | Total ... 888 „ |

49. *Municipal surveys.*—The following town surveys have been carried out:—(i) The survey on the scale of 64 inches to the mile with open ground on the scale of 16 inches to the mile of (1) Muttra (2·86 square miles), and (2) Brindaban (1·17 square mile); (ii) the survey on the scale of 64 inches to the mile of Tánda Khás (0·53 square miles); and Barehta (Fyzabad) (0·23 square miles). In Muttra and Brindaban only the exterior limits of blocks were surveyed, while in Tánda Khás and Barehta the interior limits of each house were also entered on the maps. Record writing was confined to certain columns of the field book and the preparation of area statements. The detailed survey, which was based on a close network of traverse, was tested by an average of 12·3 linear miles and 57 acres of check survey per square mile. The cost rate for the Tánda Khás work is Rs. 2,360 per square mile. The other town surveys are still in progress and their cost rates cannot yet be computed.

50. The maps of Háthras, Sikandra Rao and Atrauli towns, surveyed last year, were completed and printed, the combined cost-rates for survey, mapping, and record writing being Rs. 300 per square mile for 16-inch survey, and Rs. 2,250 per square mile for 64-inch survey.

51. *Road surveys.*—The boundaries and adjacent detail of 1,125 linear miles of first class roads in the Meerut and Lucknow provincial divisions have been surveyed for the Public Works Department at a cost of Rs. 9-6-10 per linear mile. The work was tested by 119·8 linear miles of check survey.

52. *Miscellaneous work.*—Seven junior officers of the civil service were put through a course of traverse and cadastral survey in the Moradabad district during December, and in January were employed on checking the maps and records of villages under survey in that district. The patwáris in Meja and Bára tahsíls of Allahabad, who failed in previous year to qualify in surveying, were trained in April and May. The maps of riverain areas in Ballia were inspected and reported on, and proposals were submitted for their revision and maintenance.

53. *Drawing office.*—During the year the drawing office has submitted for publication standard sheets Nos. 6, 7, 8, 82, 83, 84, 98, 99, 100, 113, 114 and 192, and the district maps of Bareilly, Sháhjahánpur and Lalitpur. The original fair sheets, 2 inches to the mile, of sheets 7 and 8 were corrected, and the other standard sheets were drawn in 4 sections for reduction, from modern material. The remaining sheets of Meerut—17, 18, 19, 30, 31 and 32—will be revised and submitted next year. Sheet 89 (Farrukhabad) is in hand, and the standard mapping of Kheri, Bahraich and Gonda will be proceeded with. Prints of the standard sheets of Hamírpur and Bánda will be corrected in the cadastral offices of those districts, and the original sheets will be afterwards corrected in the drawing office; those sheets which include portions of Allahabad, Fatehpur and Cawnpore being considered as most urgent. The one sub-surveyor attached to the office surveyed 141 square miles of the Jumna and Rámganga beds in sheets 7, 8, 68, 69. 84 and 85 during the season, and in conjunction with a sub-surveyor temporarily attached from No. 14 party, revised the area including the town and environs of Agra in sheet 25, after the latter had revised the 4-inch military map of Lucknow.

## CHAPTER III.

### Arboriculture.

Summary of work done.

54. The system of control and management of arboricultural operations remains unchanged. Avenues on 151 miles of road have been classed as established during the year, this term indicating that the trees have made such progress that they no longer require regular watering and protection. Erroneous classification detected in twelve districts during the year has on the other hand reduced the length of road recorded as provided with avenues by 54 miles. An adequate amount of planting has been done during the year. In ten districts practically the whole length of provincial roads is now provided with avenues, and operations are restricted to replacing trees that are lost; in the remainder steady progress is being made in planting roads where the soil is not hopelessly barren. It cannot be expected that all the local roads will ever be planted as many of them are too narrow to give space for avenues, but working plans recently received indicate that in one or two districts the scope for further extensions is rapidly narrowing.

55. Unsuitable trees were planted in only a few cases, and the defect has been pointed out where it occurred: the working plans now being passed provide for planting the best trees that the soil will support.

56. During the past year I have been able to see the work in progress in several districts, and I can only say that the standard is very unequal. I have seen numerous examples of healthy young avenues of productive trees, and close by, sometimes on the same road, I have seen the stumps of dead saplings, mangoes dying on the worst *usar*, and nim growing on some of the most fertile soil in the provinces. The defects have usually been traced to sheer ignorance on the part of the officials to whom the duty of supervision had been entrusted; the men actually employed on the avenues could safely neglect their work because their ignorant masters could not tell whether their excuses for failure were justified or not. I have for some time past been collecting the materials for a concise manual of arboriculture: during the year I prepared a draft of it, which was accepted by the officers to whom it was circulated for opinion, and the manual in its final form has been submitted to Government for approval. When it is in the hands of local officials, the excuse of ignorance will no longer serve, and defects in supervision can safely be dealt with as negligence.

Maintenance of working plans.

57. Working plans were adhered to in most districts: in two cases the plans were found to be defective, and in one neglect of the nurseries in previous years prevented the proper amount of planting from being done. In seven cases departures were made from the plans without adequate grounds, but in most of these the divergences were trifling.

58. About forty miles of road were planted by private persons during the year; more than half of this work was done in the single district of Fatehpur, where the roads are very bare, and the improvement will be great provided the planters take the trouble to nurse the trees to maturity, a point to which I have invited the attention of the district board. Experience elsewhere unfortunately suggests that sudden and extensive activity of this kind is apt to be short-lived.

Financial results.

59. The expenditure on provincial roads was Rs. 27,700 and receipts Rs. 47,203, leaving a surplus of Rs. 19,503, or about Rs. 500 less than in the previous year. The income was made up as follows; sale of trees cut down (Rs. 8,529), sale of fallen trees (Rs. 12,443), loppings (Rs. 2,567), grass (Rs. 17,714), other annual produce and miscellaneous (Rs. 5,950). Felling was restricted, but the loss of trees caused by storms was much greater than in the previous year. The districts in the hills and Bundelkhand naturally show a deficit each year as grass and other products are either not produced or are unsaleable. Of the remaining districts only Ghazipur, Ballia, Azamgarh and Fyzabad show deficits.

60. The local roads returned a net surplus of Rs. 10,399 to the district boards, receipts being Rs. 84,352 and expenditure Rs. 73,953 against Rs. 72,719 and Rs. 70,234 respectively in the preceding year. The surplus was thus due to increased receipts, and not to decreased expenditure; it is accounted for partly by a better mango crop, and partly by improved administration. Twenty-three boards spent substantially more than they received: this number includes the four hill districts, and seven districts lying wholly or mainly south of the Jumna. The others are Cawnpore, Ghazipur, Ballia and Basti in Agra; and Rae Bareli, Sitapur, Hardoi, Kheri, Fyzabad, Sultanpur, Partabgarh and Bara Banki in Oudh. Of the four Agra districts, Basti had practically no income from fallen trees, while in the other three the income from grass and other annual products was very low. Of the Oudh districts the recurring income is lowest in Rae Bareli, Kheri and Sultanpur.

## CHAPTER IV.

### ASSISTANCE GIVEN TO THE PUBLIC.

Distribution of implements.

61. The demand for implements of various types was about the same as last year. The stock of implements has been revised, and the catalogue is being cleared of a few which have not been found entirely satisfactory; while under the care of the Deputy Director our manufactures are being standardized and improvements in detail introduced.

62. The last rainy season afforded an interesting illustration of the view I have elsewhere put forward that in these provinces the real advantage of a soil-inverting plough is the saving of time that results from its use. This year the ground remained so continuously wet that at the end of August scarcely a single rabi field had been ploughed near the Cawnpore farm, and the land was covered with a dense growth of weeds. Directly the weather cleared a strong demand arose for the ploughs which we keep on hire, and the stock of the Watts plough was working for the greater part of September, while later in the season there was some demand for harrows or "cultivators" to cope with the thick mass of weeds in the Ganges valley. The value of the soil-inverting ploughs is undoubtedly great for a short period in each year; but experience suggests that they must be put aside directly the rains cease, or the loss of moisture which their use involves more than counterbalances their other advantages. They can never therefore replace the country plough in the hands of the small cultivator, but they are most useful as a supplementary implement to the substantial farmers who can afford to keep them.

63. Of the larger implements stocked at Cawnpore, the chaff-cutters continue in demand with wealthy men, and twenty were sold during the year.

Distribution of seed.

64. In the cash sales department 443 maunds of 28 different kinds of seed were issued from Cawnpore, and 274 maunds of wheat, barley and oats from other centres where these seeds could be procured more conveniently. As was the case in the previous year some large indents were received from outside the provinces: these large orders overtax my limited staff, and I am about to introduce a rule that single orders from outside the provinces for more seed than is required for five acres will be refused. Inside the provinces of course I shall continue to meet all demands so far as may be possible.

65. I need not repeat the description given in last year's report of the system under which seed grain is supplied on credit. Seed depôts were worked during the year on this system at Cawnpore, Mohanlálganj, Amethi, Partábgarh, Sultánpur, Gursikrán (Aligarh), Meerut, Beti (Partábgarh) and Gonda: of these Sultanpur is financed by the district board, the rest by the department. A new depôt was organized during the year at Bharatkund in the Fyzabad district, where the Deputy Commissioner has provided the necessary funds, and a stock of rabi seed was laid in, which has been issued since the close of the year. The distribution during the year exceeded 4,400 maunds (or about ten per cent. in excess of last year's demand), and all dues were recovered as is usually the case. The results of crop-cutting experiments made in Sultánpur by the district staff showed that Muzaffarnagar wheat gave a generally higher outturn both of grain and straw than the local wheat. Systematic arrangements have been made recently to repeat these crop cuttings on a larger scale at the next harvest.

66. While on tour recently in south Oudh I have made extended personal enquiries regarding the working of these seed depôts. There is a very general agreement that the seed is good, and that it is better to deal with Government than with the *mahájan*; one old cultivator put the case so clearly that I cannot do better than reproduce his remarks. "The Government wheat," he said, "usually needs one more watering, and that costs me about twenty annas to the bígah; but I get more seed, may be six per cent. and may be twelve per cent., and the *mahájan* takes it at a rate higher by one sér in the rupee than he gives for country wheat; I also get more straw, so on the whole it pays me well." This cultivator took wheat for the first time two years ago: last year he took it again, and found himself able to keep enough of his produce for seed for this year, so that he at any rate is not a theorist.

67. It is this question of saving seed that is the great difficulty. The object with which I began to distribute seed was agricultural, not economical: I hoped that after a year or two the enterprising cultivators of a locality would save their own seed, enabling me eventually to transfer my operations to another locality, and thus gradually to renovate the seed stocks over a large area. This result has been in some measure attained: the more substantial cultivators in some cases save their seed, notably about Meerut, (where they are glad to borrow the sieves we use in cleaning seed), while in a few instances *mahájans* are issuing for seed the produce of the improved strains that they have received from cultivators. But the bulk of the tenants in south Oudh, where the demand is greatest, cannot afford to carry

a stock of those seeds, such as wheat, of which a large quantity goes to the acre, and these men, having experienced the advantages of the seed we offer, want us to supply them year by year. As these poor men form the bulk of our customers, I have been somewhat disquieted as to the possible future developments of the movement, and particularly as to the risk of a boycott by the dealers. Transactions with individual cultivators are exceedingly burthensome to the superior staff as very close supervision is required to prevent malpractices, not so much on the part of borrowers as on that of the inferior agency we must employ. The field of effort is thus greatly narrowed, and there is always the risk of a breakdown in the organization, or of a reversal of policy, which would leave our customers helpless for the time being. The difficulty could be solved by seed societies on a co-operative basis, and the people with whom I have discussed this solution seem to like the idea. The first scheme of the kind was suggested by the Registrar, and the details will be worked out by him.

68. Incidentally it may be mentioned that my operations have had the unexpected result of reducing the rate of interest in some localities. At the start I was particularly anxious to avoid any charge of interference with the dealers, and the rate of interest was fixed at what my information led me to believe was the standard of the country (namely 25 per cent. for the harvest); but I find that in fact the rate varies from 25 to 50 per cent. even within narrow limits, and that the offer of seed at the lower rate, (aided of course by the recent favourable seasons), has made some dealers lower their rate from 50 to 25, and has curbed the dishonest calculations of a few.

69. On the whole the result of my enquiries has been most encouraging, and the keen appreciation which the best cultivators display both of the advantages and of the risks of co-operating in seed-supply affords fair ground for hoping that some communities at least will take over the detailed administrative work which at present prevents me from extending operations, and will utilize the savings thereby effected in gradually acquiring a stock of seed for themselves.

70. I must not omit to record in this place my acknowledgments to the Tahsildár of Amethi, Saiyid Alimuddin Husain, who has rendered much help to the Assistant Director since operations were first started in that locality.

Distribution of cotton seed.

71. The unfavourable season of 1903 left me with a very small supply of the acclimatized medium-stapled seed which has been grown for several years past at the Cawnpore farm, and which does not appear to be deteriorating. Some of this was grown for seed, and a little was lent to a cultivator whose land adjoins the farm. The rain was locally excessive at sowing time, and he got a poor crop; but much worse results were obtained by the distribution of American seed of three other varieties, (Dharwar acclimatized, Allen hybrid and King's improved), received from the Inspector-General of Agriculture: one cultivator got a single picking from this crop, the others experienced entire failure and ploughed the land up without waiting for the picking season. These varieties also failed on the farm. A few cultivators have applied for Cawnpore seed to sow next year, and as much as possible will be distributed. Two varieties, Dharwar and Broach nausari, were received from the Inspector-General and distributed in Jalaun; these also were almost entire failures.

72. I think it may safely be said that there is no room for the growth of really long-stapled cottons on any considerable scale in these provinces, nor is their growth a matter of particular importance as the demand for them is comparatively limited. What is really wanted is a medium-stapled cotton of a hardy type, which could be spun profitably in this country. The Cawnpore acclimatized varieties answer this description fairly well, but subject always to the condition that the cultivators will be able to cope with the insect pests which cause us so much anxiety at the farm.* Whether this condition can be realized will be determined after a few more years' experience; and if it is, there is apparently no reason why these medium-stapled cottons should not be produced on a moderate scale, perhaps sufficient to meet the local demand; but the hardy and saleable short-staple cotton will probably continue to occupy most of the land devoted to the crop.

73. Our ten years' experience of the improvement of the local cotton by selection and better cultivation is most discouraging; the improvement is so very

* A full description of the principal pests will be found in chapter IV of the report on the Cawnpore farm for the year ending June 30th, 1904.

small that there is no reasonable hope of this cotton ever rising to such a grade that it can be classed even as medium-stapled. In any case at least twenty years will be needed to secure any material improvement: and it must be remembered that improvement gained by selection and cultivation is lost very quickly if the treatment is not maintained. All attempts to cross our local variety (or species) with long-stapled American cottons have so far ended in failure, as not a single seed is known to have set either at Cawnpore or at Saháranpur; the attempt to produce suitable hybrids will be continued under the supervision of the Economic Botanist.

Well sinking and allied subjects.

74. The demand for the services of trained borers continues to increase: five men were trained during the year, raising the number to 22, but three of these entered private employment so that only nineteen are available in the department. It is of course matter for congratulation that our trained men should be taken on the staff of large estates, as their skill is then available for the locality; but for the time being the loss of our best workers reduces the amount of work that we can get through. The outturn of the year is however satisfactory, as the number of borings taken has increased from 183 to 251. The supervisor (M. Ahmad Husain) has been more than fully occupied in controlling the increased staff, conducting special enquiries, and giving advice in particular cases of difficulty. Among other duties he was employed in giving practical effect to the measures he had proposed for improving the drinking water in some parts of the tarai; the success he attained in the two wells which he treated was so striking that a sub-overseer has now been employed on the Government estates to carry out similar improvements wherever the water is bad: the official chosen has just been through a course of special training under the supervisor.

75. The simplification of our methods of boring still occupies my attention. An auger with proper shafting serves the purpose admirably so long as no sand is met with; and a tool of this kind has been used with great success in deepening existing wells in parts of the Gházipur district where sand-beds are rarely met with. But the auger appears to fail entirely when a considerable sand-bed is met with, and as this contingency has to be expected in most districts the tool can be used only in special cases. I am now experimenting with an ingenious tool invented and patented by Mr. Martin, a landholder of Khorason in the Azamgarh district, and used by him with success in deepening wells; I am not yet prepared to say whether it will be equally successful in making trial borings, as though it can be worked with much greater speed than our present tools there may be difficulty in determining the depths of the various strata with sufficient accuracy to enable sound advice to be given, but I am hopeful that this difficulty may be surmounted. I can confidently recommend this tool for use where it is desired to increase the supply of water in a well by sinking an unlined bore-hole to tap springs at greater depths.

76. That old problem of the department, the construction of percolation wells of a permanent nature in tracts where the absence of a clay stratum makes spring wells impossible, has again become acute. Mr. E. A. Molony, I. C. S., whose studies in the theory of the subject were published a few years ago in one of the departmental bulletins, has been kind enough to put his theories into practice; and the experimental well which he has sunk at the cost of the department is expected to be ready for a thorough test during the cold weather. Should it fail, other methods of reducing the velocity of inflow sufficiently to prevent the movement of sand into the well will have to be tried; the problems that have to be solved are intricate, and I shall probably have to ask for assistance in order to attack them effectively.

Cattle breeding.

77. Three bulls were procured for applicants during the year, but it becomes more and more hopeless to attempt to purchase bulls fit for breeding. The decision to establish depôts, where bulls (bought young) can be reared until fit for use, was noticed in last year's report. A suitable site has been found in the Bánda district and a few young bulls were turned on to it during the year, while more have been purchased in the last few days. All purchases have been made by the Deputy Director in person. The Deputy Commissioner of Kheri has been asked to choose a site for the second depôt which it is proposed to establish in that district.

78. Stud bulls were maintained as usual at the Cawnpore farm, and at Meerut the stud belonging to the district board was managed by the employees of the department.

79. I had to remove the salutri employed at Cawnpore for misconduct: his place has been filled by a veterinary assistant with higher qualifications, who will not be employed on tour, and under him the dispensary is beginning to do work of greater value. It is maintained partly for the benefit of our neighbours at Cawnpore, and partly for the instruction of students at the agricultural school, of the staff of which the veterinary assistant will soon be a member.

Veterinary dispensary.

## CHAPTER V.

### Supply of information.

80. Press of other work has prevented the issue of any English bulletins during the year; since its close two have been prepared for the press, one of which describes the Assistant Director's work on the manufacture of sugar and the other deals with the improvement of drinking-water in the tarái. In the series of popular bulletins, published in vernacular, a note on inoculation for cattle-disease has been circulated in those parts of the provinces where Government considered it might safely be issued. As mentioned in last year's report, arrangements were made to issue in this series translations of the entomological circulars published by the Indian Museum, and several translations were prepared; but their distribution was stopped at the instance of the Government Entomologist who found that the information they contain was not in all cases up to date.

Publications.

81. The important study of wheat-rust, the joint work of the Cryptogamic Botanist and the Deputy Director, is still unpublished, owing, as I understand, to the difficulty of printing the plates; I have contributed a statistical note on the weather conditions that favour rust, and the publication of the whole is in the hands of the Cryptogamic Botanist.

82. The preparation of the Arboricultural Manual has been mentioned in a previous chapter; and I may also record the issue of *The Agriculture of the United Provinces*, a general sketch of the subject for the use of officials and others. I began the preparation of this hand book with the intention of issuing it as a departmental publication, but as its subject-matter is necessarily to some extent controversial I eventually decided to publish it unofficially.

83. The circulation of the journal, published in Urdu, continues to increase, and now stands at 660 monthly. Evidence of the growing interest in this periodical is found in the increased numbers of books received for review, in the larger number of articles contributed gratis by subscribers, and in the extent to which articles are copied in the vernacular press. I have recently arranged for some changes in the style and arrangement of the journal which will increase its usefulness, and, I hope, its popularity.

Agricultural Journal.

84. We have had 1,027 unofficial correspondents during the year, or more than 100 in excess of last year's record. There is no doubt that the increase of interest in agricultural matters, which has been noticeable of late in most parts of the world, is spreading to the educated classes in these provinces; and if some of the enquiries deal with hopelessly unpractical schemes, others—and I think the majority—indicate that the writers are sensible men and understand what they are talking about. I need hardly add that this portion of the Director's duties is particularly pleasant as well as important; and I have recently reorganized the working of my office to secure greater promptitude and efficiency in dealing with unofficial enquiries.

Summary of correspondence.

## CHAPTER VI.

### Associations, shows and demonstrations.

85. A meeting of the managers of the larger Court of Wards estates was held at Cawnpore in March, 1904. In addition to the managers invited under the orders of the Board, the meeting was attended by the Superintendent of the Tarái, and by the Joint Secretary to the Board of Revenue, while the third

Meeting of Court of Wards managers.

Member of the Board visited the camp to meet the managers who were present. As in previous years, the arrangements were as informal as possible : a few demonstrations of general interest were given, the programme of improvements was discussed with each manager, and arrangement made so that each individual could benefit by the experience of others. One day of the meeting was spent in considering the draft manual of the Court of Wards, and I understand that the Joint Secretary much appreciated the opportunity of ascertaining the views of those who were present.

Associations.

86. From the Porter Association of Allahabad I have received the proceedings of a meeting held in February 1904 under the presidency of the Collector of the district, but the latest account that has reached me of achievements, (as distinct from aspirations), is that which was noticed in last year's report. The Bijnor Association remains quiescent, while that of Sultánpur is reported to have held a meeting. The Secretary of the Porter Association, which of all the constituted or embryo societies I have come in contact with alone does any practical work, makes a very just remark in his report of the last meeting : " The attention of the members," he says, " has been fluctuating : active and increasing when magnetized by any official co-operation, passive and decreasing when any official of the time has not enough leisure or pleasure to spare." In other words, these societies have no organic life, but they can be galvanized into a semblance of activity, which however produces no result of permanent value. The work of the Porter Association is the work of its Secretary, Rai Mahabir Parshad Narain Singh, Bahadur, to whom all the greater credit is due.

Agricultural shows.

87. Agricultural shows were held during the year at Kakora (Budaun), Aligarh, Bulandshahr, Muzaffarnagar, Meerut, Harrisonganj (Allahabad) and Sultánpur. The Sultánpur show was managed chiefly by the Assistant Director; the remaining shows were attended by the executive officials of the department. At Sultánpur the Commissioner of Fyzabad presided over meetings at which lectures were delivered and demonstrations given by the Assistant Director. At this fair young bulls of good breeds were given to successful exhibitors as part of the prizes allotted, this plan being looked upon as a means of introducing better strains among the cattle of the district. In the other shows my officials rendered assistance to the local committees in judging the exhibits of produce, cattle and implements, and in displaying the exhibits contributed by the department.

88. The managing authorities of these shows have to face the dilemma experienced in other countries, that people will not come to see a mere display of produce and implements, while the provision of other attractions, (or what are vulgarly called side-shows), usually tends to throw the agricultural features into the background. I do not profess to think that the ideal compromise has been arrived at in the case of any of these shows ; at present I think the side-shows generally have the best of it, but in saying this I have no intention of blaming the local committees with whom the management must rest ; their task is one of great difficulty, and the ease with which the people of the provinces throw aside all thought of every-day things in their whole-hearted enjoyment of what they know as a *tamásha* must always limit the practical value of efforts into which the spectacular element enters.

Cattle shows.

89. I cannot say that the cattle-shows organized in accordance with the wishes of the Government of India have been so successful as I had hoped. The shows in Gonda and Bahraich had to be entirely abandoned owing to the prevalence of plague in the locality ; of those which took place, that at Karwi in Bánda was on the whole the most valuable. Further experience is necessary before we can decide whether the shows are likely to establish themselves permanently.

Meerut demonstration farm.

90. The Meerut demonstration farm came under the direct control of the department in October 1902 ; the conditions of its retention are that it should be managed for two years, after which it is to be abandoned if it does not pay its way, or if there is nothing to demonstrate for the practical benefit of the locality where it exists. As regards the first condition, the balance sheet for the period from October 1902 to June

1904, prepared strictly in accordance with accepted methods of farm book-keeping, shows a slight loss, which is due mainly to the poor condition in which the farm was taken over ; the expenditure during the period under discussion will naturally give some part of its return this year, and so far as I can estimate at present a moderate profit will be earned. As regards demonstrations, I will be able to speak with more certainty next year : I have not yet been able to verify by personal enquiry the improvements which our neighbours are reported to have copied from the farm practice.

Private demonstration farms.

91. The Jatau farm in the Agra district, which is owned and managed by Kuar Karan Singh, continues its unobtrusive but useful work. The other private farm, situated at Sultánpur, has been in abeyance for the last two years.

The sugar factory.

92. The improvements made in the method of manufacturing sugar were demonstrated during the year at Bareilly, Sultánpur, and Rámpur ; the demonstrations at the lastnamed place were given at the instance of the state authorities. A description of the methods demonstrated will be found in the bulletin on the subject which is now in the press, and need not be repeated here. So far as I can judge the Rohilkhand manufacturers are much interested in the methods which they have seen, which undoubtedly yield more and better sugar than they themselves can produce from the same weight of juice ; and some of them are considering the idea of adopting some or all of the new processes. It remains to be seen whether their appreciation of the advantages offered is sufficient to overcome the natural reluctance to change familiar methods. Apparently prices this season are going to be somewhat above the level of the last few years, and this fact will naturally tend to retard the introduction of improvements, which were suggested originally in order to meet the fall of prices and consequent loss of profits.

## CHAPTER VII.

### Agricultural Education.

The Agricultural School.

93. The post of principal was held throughout the year by Mr. B. V. Patwardhan. The work of the school suffered to some extent from unavoidable changes in the staff of assistant masters ; the fact is that the scale of salaries hitherto in force has been too low to enable me to retain the services of competent teachers ; such men are rare in India and the competition of other institutions is increasing.

94. The class admitted to the school in 1902 consisted of 29 students ; the final examination of this class was held in April 1904, and was, as usual, conducted by the officers of the department : 25 students passed and three failed, while one was expelled for unfair practices during the examination. The class admitted in 1903 numbers 30, and that of 1904 includes 28 students.

95. The outdoor work of the school has been carried on successfully on the lines noticed in previous reports. The various school clubs have prospered ; and an old boys' club has been founded by the former students. The first meeting of this club was held in the year under report, and attracted a small gathering : but the second meeting, which took place at Christmas was exceedingly successful, being attended by over sixty old boys or about one-third of the whole number known to be alive. Gatherings of this kind may prove of the greatest value to the school, and I trust that they will continue to be supported.

96. The health of the school was satisfactory throughout the year, and I think it may be fairly claimed that the difficulties of sanitation have at last been overcome.

97. Sanction was accorded during the year to certain proposals which I submitted for the development of the school. These include additions to the buildings, improved equipment in the way of apparatus, library and museum, a larger and better paid staff ; and in particular the establishment of a school farm to be worked strictly on commercial lines. I hope to have the new staff at work by July next : the two chief teachers have already been selected and are receiving special training for their posts, one in the chemical laboratory at Dehra Dún, the other at the botanical laboratory at Poona.

98. So far the school has been thoroughly successful in attaining the first object of its establishment, the training of candidates for the subordinate revenue service. In the ten years of its existence, 165 kanúngo candidates have passed through the course : of these 133 are in Government service, 26 are waiting for employment and six are otherwise accounted for. Of the 133 in Government service, 115 are serving as supervisor kanúngos (permanent or temporary), and of these eight have been selected for appointment as naib tahsíldárs ; while four men hold posts inferior to that of supervisor, and fourteen men hold equal or superior posts, *viz.* two sadr kanúngos, three naib tahsíldárs, and nine employés of the agricultural department in these or neighbouring provinces. The school has also succeeded to some extent in providing the minor staff for this and other agricultural departments, but service of this kind is still unpopular with parents, who very naturally prefer to see their sons entering the revenue line, with its large staff and assured prospects, and I have considerable difficulty in securing the right type of student for work at Cawnpore : *à fortiori* I am usually unable to comply with the requests of individuals and unofficial bodies to send them trained agriculturists for work in schools or on estates. It is, I think, certain that the idea of employing trained men in estate management is gaining ground in some parts of the provinces, and it is a movement which once started will I expect develope with great rapidity, even now the demand is in excess of the supply. I have little doubt that this matter will right itself in time, and that as the competition for Government services increases in intensity parents will gradually recognise the advantages of the land agent's profession. The course of training in the school is being remodelled so as to give room for a thoroughly practical training in estate management.

99. It is not to be expected that in a land of small holdings any great proportion of our students will take to farming for themselves, and the influence of the school must be exerted mainly through the landholders : but the fact is worth mentioning that of three students of high caste who have recently settled down to farming, one has set up in business as a seed-grower, the second is transforming his land by liberal manuring with poudrette, and the third is establishing a free school for cultivators on his farm. These enterprises may of course succeed or fail, but any one of them would have been unthinkable ten years ago, and their existence is evidence of the new ideas that are abroad.

100. Before leaving the subject of the Agricultural School I may be permitted to acknowledge the generosity with which the Government of India provided for the family of Mr. Subbiah, the first principal, to whom the school and indeed the department is indebted so deeply. Apart from the Government grant, a memorial fund was raised by the old students, and the sum collected by them, together with contributions from some European officers has proved sufficient to provide for the education of Mr. Subbiah's son, and for an annual memorial prize, the first endowment which the school has received.

Moradabad normal school.

101. The agricultural class at Moradabad was closed in April under the orders of Government. It will be remembered that the object of the class was to provide teachers in agricultural secondary schools, the establishment of which was at one time contemplated. As there is no present intention to establish schools of this kind, the further maintenance of the class was obviously unnecessary.

Village schools.

102. The department has not been consulted during the year on questions connected with primary schools.

Industrial training.

103. Under the orders of Government the question of industrial training was considered during the year in connection with (*a*) the scheme of State scholarships, (*b*) the needs of organized industries at Cawnpore and Háthras, and (*c*), the requirements of indigenous industries. The results were reported to Government.

## CHAPTER VIII.

### Miscellaneous.

Co-operative credit societies.

104. My inspector was employed during the greater part of the year in auditing the accounts of co-operative credit societies, and in giving advice regarding their constitution and working. A registrar of these societies has now been appointed who has taken

over my inspector, and who will report separately to Government on the work of his office. The subject therefore no longer requires discussion in this report.

Conclusion.

105. I may fitly conclude this report by expressing my acknowledgments to the officers on the staff of the department for their assistance during the past year. It will be gathered from the foregoing chapters that activity has increased in all branches of our work; the resulting strain on the staff has been severe, perhaps in some cases excessive, and where all have done their best it is unnecessary for me to select individuals for special mention in this place.

I have the honour to be,

SIR,

Your most obedient servant,

W. H. MORELAND,

*Director.*

# ORDERS OF GOVERNMENT.

No. $\frac{987}{\text{I—196-1905}}$ OF 1905.

## RESOLUTION.

REVENUE DEPARTMENT.

*Dated Allahabad, the 18th April* 1905.

READ—

Letter no. $\frac{565}{\text{VIII—548}}$, dated 23rd January 1905, from the Director of land records and agriculture, United Provinces, being his report on the operations of the department of land records and agriculture for the year ending 30th September 1904.

Read also—

Letter no. $\frac{44}{\text{VII—47(2)}}$, dated 22nd February 1905, from the Board of Revenue, United Provinces, forwarding the report with remarks.

OBSERVATIONS.—The report of the Director of land records and agriculture is remarkable in having no statistical appendices. It deals with a department which differs from all others in the provinces in its capacity for expansion. The department has practically no limits, for though the branch relating to land records is confined to definite subjects, that dealing with agriculture, the means of livelihood of the bulk of the population of the province, is boundless, its scope being limited only by the spending powers of the Director. Within the means at the disposal of the Director the progress made has been considerable, as the present report shows. These means are now to be supplemented, the Lieutenant Governor is glad to say, by a grant made by the Government of India for agricultural research and instruction, as announced in paragraph 26 of the financial statement for 1905-6, and the activity of the department and the benefits resulting therefrom will increase in proportion. In no department is the return for money spent of more direct advantage to the people.

2. In the land records department, though the general scheme for the employment of additional establishment for which funds exist has not yet been sanctioned, an increase in the staff of kanungos and patwaris during the year is recorded, and in many other directions improvements took place, such as the revision of circles, the better education of patwaris, location of a larger number within their circles, and greater punctuality in filing papers. Neglect and want of method in the testing of patwari papers by superior officers have again to be noticed. The Board are requested to impress the remarks made in paragraph 3 of their forwarding letter upon the officers of the districts concerned. The Lieutenant Governor is glad to hear of the good work done by the four assistant collectors posted to the districts which required special attention. The chief blot on the administration is the very unsatisfactory state of the records in some of the eastern districts. It is reported that in one sub-division (Kasia) of the Gorakhpur district about a lakh of rupees was omitted from the rent-rolls, and that the jamabandis in the Basti district had practically not been maintained since

the settlement of 1889. The discovery of the worthlessness of the greater portion of the Basti records appears to have been made in 1902, since when the khewats have with much labour and care been taken in hand and put into good order. Mr. Adams' inspections during the past year brought to light further serious defects: owing to the absolute authority exercised by the landholders over the tenants and the patwaris, rents are concealed wholesale and tenancies are frequently not recorded at all. The measures adopted for dealing with this state of affairs were the punishment of the officials directly responsible, the increase of the staff, and the placing of a selected officer in charge of the district who will remain there for some years. The progress made in securing improvement should be fully reported upon annually.

3. Of the agricultural projects which promise to be of the greatest use to the rural population, the Lieutenant Governor looks upon the development of dépôts for the supply of seeds on a co-operative basis as one of the most important, and hopes that the measures now in train under the newly appointed Registrar of co-operative credit societies for the establishment of a new system may prove successful. An important subject, the improvement of the breeds of cattle, has received attention for a longer period than seed dépôts, but so many difficulties in this case have to be overcome that the progress made has been inconsiderable. The work has suffered to some extent from the weakness of the superior staff, the Deputy Director's time being very fully occupied in other branches of work: it is hoped that an assistant veterinary officer will shortly be appointed who will be able to confine himself chiefly to the subject of cattle.

4. From the development of the agricultural school, the Lieutenant Governor looks for the most practical benefits. Not only is the supply of a better class of officials for the subordinate revenue service secured, but there are indications of a demand arising for non-officials as land agents and managers of estates. Similarly, training of experts in sinking wells and boring for water is likely to provide employment of the most useful nature both within and outside the department. His Honour hopes to be in a position shortly to extend this system which has proved so successful and popular since its introduction.

5. It is gratifying to learn that in no less than ten districts practically the whole length of provincial roads is now provided with avenues, a striking testimony to the success of the sustained efforts made by the department for many years past, and the time will no doubt arrive when the same can be said of all other districts in the provinces. The manual of arboriculture prepared by the Director in consultation with local officers, the issue of which has been recently sanctioned by Government, is thoroughly practical, and will be found of the greatest assistance to district officials.

6. The Government is indebted to Mr. W. H. Moreland, C.I.E., for an interesting report and for his efficient administration of the department during the past year. He has found time to publish a hand-book on agriculture, which contains in a small compass much valuable

information. Copies have been supplied by Government to revenue and irrigation officers, and the Board of Revenue, it is understood, has distributed copies among managers of estates. It will form an admirable book of reference for Assistant and Deputy Collectors when on tour.

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ORDER.—Ordered that a copy of the above Resolution be forwarded to the Director of land records and agriculture, United Provinces, for information.

Ordered also that a copy be forwarded to the Secretary to the Board of Revenue, United Provinces, for the information of the Board.

By order, &c.,

W. H. L. IMPEY,

*Chief Secy. to Govt., United Provinces.*

# REPORT

ON THE

# Operations of the Dept. of Land Records & Agriculture,

## UNITED PROVINCES OF AGRA AND OUDH,

FOR THE YEAR ENDING 30th SEPTEMBER 1905.

*ALLAHABAD:*

Printed at the United Provinces Government Press;

1906.

[Prescribed maximum limit of the report, 25 pages, excluding tabular statement.]

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# REPORT

ON THE

# Operations of the Department of Land Records and Agriculture,

## UNITED PROVINCES,

***FOR THE YEAR ENDING THE 30TH SEPTEMBER 1905.***

No. $\frac{635}{\text{VIII—596}}$.

FROM

W. H. MORELAND, ESQ., C.I.E., I.C.S.,
DIRECTOR, DEPARTMENT OF LAND RECORDS AND AGRICULTURE,
UNITED PROVINCES,

TO

THE CHIEF SECRETARY TO GOVERNMENT,
UNITED PROVINCES, REVENUE DEPARTMENT.

*Dated Lucknow, the 22nd January* 1906.

SIR,

I HAVE the honour to submit the annual report on the administration of this department for the year ending the 30th September 1905. This report does not profess to cover the whole activity of the department. The record of the economic facts of the year will be found in the Season and Crop Report, the reports on Inland and Foreign Trade, and the forecasts and reports on particular crops; the experiments and investigations pursued during the year are dealt with in the report on the Cawnpore Farm and other Experiment Stations; the remaining functions of the department form the subject of this report.

## CHAPTER I.

### PREFATORY.

Officers on the staff.

2. I was in charge of the department throughout the year: the post of Deputy Director for Agriculture was held by Mr. J. M. Hayman and that of Superintendent of Provincial Surveys by Captain W. M. Coldstream. The new appointment of Economic Botanist took effect from 19th November 1905, when Mr. H. Martin Leake, M.A., F.L.S., joined his post. The Assistant Director, Saiyid Muhammad Hadi, M.R.A.C., M.R.A.S., returned from privilege leave on 5th November 1904 and held his post for the rest of the year. Mir Saiyid Husain was my Personal Assistant throughout the year except for a short period of privilege leave.

3. In addition to the permanent staff of the department, Mr. E. F. Oppenheim, I.C.S., was posted to it in February to relieve me of the routine work of the land records side, and remained until the end of the year. I should like to take this opportunity of acknowledging the great assistance which he rendered to me and the zeal and discretion with which he performed his duties in the department. Mr. S. H. Fremantle, I.C.S., was associated with the department from July onwards while on special duty in connection with the labour question.

Tours of officers.

4. My inspections during the year began in October with a visit to Sitapur to meet the Junior Member of the Board of Revenue for a consideration of the cadastral maps of that district. The rest of this month and the first few days of November were spent at Cawnpore and Lucknow; from November to February I was on tour in South Oudh, except for visits to Allahabad and Lucknow, and for the meeting of the Board of Agriculture at Pusa; my inspections during this period extended to the districts of Unao, Rae Bareli, Sultánpur, Partábgarh and Lucknow. During the rest of February I visited Aligarh and Orai to select sites for agricultural stations

and was present at the Sultánpur agricultural show. March and April were spent mainly at Cawnpore, with visits on departmental duty to Allahabad and Lucknow. May and June were spent as usual at Naini Tal : during the rains I went to Orai, Bánda, Aligarh, Muzaffarnagar, Saháranpur, Lucknow, Bahraich, Sitapur, Bara Banki, Partábgarh and Budaun, returning to Naini Tal at the end of August : on this tour besides the ordinary inspections I conferred with several district officers and special managers regarding the improvement-programmes on estates under the court of wards, in accordance with directions received from the Member of the Board of Revenue in charge of that department.

5. Mr. Oppenheim visited 16 districts during his service in the department for inspection of land records routine.

6. In the field season the Superintendent of Provincial Surveys inspected the field work and the survey offices in Moradabad, Hamírpur and Bánda, conducted a training class for ten junior officers of the Indian Civil Service, checked the topographical work in progress in Meerut and Bahraich, and inspected the office of the Traverse Section at Moradabad. In July the Superintendent again inspected all the offices under h s control.

7. The Deputy Director of Agriculture during the cold weather attended the Karwi cattle show and visited Banda, Pailani and other places for the purpose of buying bulls. During January he attended the meeting of the Board of Agriculture at Pusa. Later in April and May he again visited Hamírpur and Banda for the purpose of buying bulls. At different times during the year he has visited Orai, Aligarh and Partabgarh to assist me in selecting sites for agricultural stations and for investigations of various kinds.

8. The Assistant Director's time has for the most part been divided between the demonstration of his improved sugar-factory and the administration of the seed-depôts in South Oudh, the continued expansion of which has left him little time for visiting other parts of the provinces.

Special features of the year's work.
(a) Agriculture.

9. The most important fact of the year is the decision to reorganize the department on the larger scale rendered possible by the generosity of the Government of India. The scheme of development that has been adopted has been made public in Resolution No. 2823/I—354-1905 issued on 22nd September 1905, and need not be recapitulated in detail, but it is desirable to indicate here the action that has been taken to bring it into being. The main features of the scheme are the establishment of an agricultural college with research laboratories at Cawnpore, the multiplication of agricultural stations throughout the provinces, the organization of a general agricultural staff and of a special staff for well-sinking and the appointment of a Deputy Director for land records : there are, in addition, certain veterinary developments which will be more conveniently dealt with in the report of the Civil Veterinary Department.

10. As regards the college, the residences for the European staff are now well advanced, while the ground-plan of the college and laboratories has been settled after exhaustive discussion, and I hope the complete project will shortly reach me from the Public Works Department. A provisional selection has been made for the post of Principal, and the Secretary of State has been asked to select an Agricultural Chemist, who, with the Economic Botanist already attached to the department, will complete the European staff considered necessary for the present. The native staff for the college has been selected, and special training has been given or arranged for where it was needed.

11. As regards agricultural stations, the farm at Orai began work in June last, and land has been selected and notified for appropriation in Aligarh and Partabgarh ; projects for the necessary buildings at these stations have been submitted or are in preparation. Sites for other farms are under consideration, but it will be readily understood that they cannot all be opened at once as the training of the staff to work them is a matter of years.

12. Turning to the agricultural staff, two officers have been asked for from England in addition to the two now employed in the department, and a beginning has been made in the organization of the native staff, which now numbers 25 ; this number will be increased as the young men in training qualify for more or less independent work. Selections have also been made for the well-sinking staff, but

its organization is postponed until a decision has been arrived at regarding the equipment that is to be adopted. Finally an officer has been selected for the post of Deputy Director of land records and is attached to the department pending the receipt of formal sanction to his appointment.

(*b*) Arboriculture.

13. Special interest has been raised in arboricultural matters during the year by the issue of a Resolution of the Government of India dealing with the whole subject. In these provinces the Manual of Arboriculture has been issued, and arrangements have been made for training supervisors; enquiries are now in progress as to the districts where additional funds can be profitably utilized.

(*c*) Land Records.

14. On the land records side of the department the most important changes have been the redistribution of the staff of assistant registrar kanúngos, and the alterations in the organization of the survey staff. The former is noticed in the following chapter: the latter was rendered necessary by the requirements of the Survey of India which led to the withdrawal from provincial work of all technical officers who could be spared. Among these is the late Superintendent of Provincial Surveys, Captain W. M. Coldstream, R.E., who has held that post for more than four years. The ideals of an enthusiastic surveyor must from the nature of the case differ widely from those of departments which regard detailed surveys as necessary evils, preliminary to settlement and record operations; it is therefore all the more satisfactory for me to be able to record that in the course of our prolonged official association we have not had a single difference of opinion that could not be arranged between us, and that I have throughout received from Captain Coldstream the heartiest co-operation in the survey itself, and the most generous assistance in the questions regarding maintenance of existing maps on which I have so frequently sought his advice.

(*d*) Miscellaneous.

15. Among the miscellaneous duties of the department the only point that calls for special notice is the discussion of the existing statistics of wages. The views I ventured to put forward on this question were accepted by the Government of India,* and Mr. Fremantle and I prepared during the year a complete scheme for a quinquennial wage-census to replace the existing half-yearly returns. The scheme has just returned from the Director-General of Commercial Intelligence, and will shortly be submitted to Government.

*G. G. O. No. 1565 76-2, dated 20th July 1905.

## CHAPTER II.

### (1)—Land Records.

Establishment.

16. During the year under report a scheme was approved for reallocating the staff of registrar and assistant registrar kanúngos. The allocation made about ten years ago was undoubtedly faulty, and changes in the rules of the department had aggravated the inequalities: the existing staff was utterly inadequate in many of the eastern districts, and the additional staff required was provided by reductions in those districts, mostly in the western divisions, where the staff was in excess of requirements. The net result of the scheme, to which effect has been given since the close of the year, is the addition of two registrar kanúngos to the staff and the abolition of the posts of four assistants. The proposals included the raising of the pay of all assistant registrars from Rs. 15 to Rs. 20; sanction was accorded to the raising of the pay of one post in each tahsíl and the complete scheme will be introduced as soon as funds permit. A new patwári school was opened at Meja in Allahabad for the benefit of the trans-Jumna tahsíls of the district. An assistant teacher was added to the school establishment at Azamgarh and the temporary assistant teachers at Fyzabad and Lucknow were continued. The number of patwáris rose by 24, as the net result of revision of circles in various districts. The orders of the Secretary of State on the general scheme for strengthening the staff of supervisors and for grading the sadr kanúngos had not been received at the close of the year under report; they have just reached me and will now receive effect.

17. Assistant patwáris were sanctioned for ten circles in Bahraich and the scheme for Sháhjahánpur sanctioned in the previous year was introduced. Proposals for the revision of circles in the Etah and Pilibhít districts were submitted and a scheme for reallocation in Jalaun has been received from the Settlement Officer. The orders of the Government of India on the proposals referred to in last year's report for introducing the final scales in five districts, and for raising the pay of the lowest grade of patwaris and of the assistants in other districts have just been received.

Revision of circles.

18. During the year one supervisor was appointed an excise inspector, another a ziladár under the Court of Wards, while three were promoted to the post of sadr kanúngo. Three kanúngos were selected as approved candidates for naib tahsíldárships and twenty-two officiated as naib tahsíldárs in temporary vacancies, one supervisor was appointed a teacher in the agricultural school at Cawnpore while three were transferred to the agricultural staff of the department.

Promotion of kanúngos.

19. Four patwáris were permanently promoted to higher posts in the district establishment, while 15 received temporary promotion as assistant registrars. Several district officers have expressed the opinion that patwáris make better assistant registrars than other candidates and that the prospect of promotion to the registrar's office acts as an incentive to good work. Seven patwáris were exempted from the educational test under the authority delegated to me by Government.

Promotion of patwáris.

20. The percentage of passed patwáris rose to nearly 92, and that of exemptions fell from five to four. The balance consists almost entirely of posts vacant and of heirs appointed conditionally under the rules. The number of unpassed men other than heirs is still high in Azamgarh where they have been prevented from attending the school by record and settlement operations.

Education of patwáris.

21. A special text book in mensuration has been prepared by Babu Ram Ratan Lal, Deputy Collector, and will be introduced into patwári schools after revision of certain sections by my staff. The good conduct allowances of three teachers were raised, and four teachers were granted allowances during the year. The expert surveyor on my inspection staff was employed in examining the teaching of survey and map-work in patwári schools, and improvements in the methods employed are being gradually effected. A note on practical methods of map-correction which Captain Coldstream was kind enough to draw up for me was issued during the year for the guidance of teachers in removing the defects pointed out by the inspector.

22. The percentage of patwáris returned as resident rose from 75 to 78. The number of exemptions generally decreased, but a number of new exemptions was granted in Bareilly and Bahraich. In both districts there was at the same time a large increase in the number of patwáris who became resident within their circles. I need not discuss the figures in detail, since as has been pointed out in previous reports their value is very unequal ; but I may say that I am satisfied from the reports and from the result of inspections that the obligation of residence is slowly becoming more and more of a reality.

Residence of patwáris.

23. The papers were filed with fair punctuality though the high standard of the previous year was hardly maintained. Ninety-five per cent. of the area statements, 89 per cent. of the crop statements and 88 per cent. of the rental statements were filed in time ; the corresponding percentages in the preceding year were 95, 92 and 89. The extra work thrown on patwáris and supervisors by enquiries into the damage from frost accounts for the delay in many districts ; the emergency came at an awkward time of year when there was no margin available, and the crop and area statements necessarily fell behind. Nearly all the belated statements were filed within a month of the due date, and for the provinces as a whole only 1,814 records (as compared with 4,471 in 1904) were more than a month late. All the papers were filed in time in Fatehpur, and nearly all in Bijnor and Agra. Of districts not under settlement or survey unpunctuality was most noticeable in Sultánpur, Sitapur, Hardoi and Sháhjahánpur.

Filing of patwáris' papers.

Testing of patwáris' papers by supervisors.

24. The testing done by supervisors was in excess of the prescribed minimum in all districts except Mainpuri, Moradabad, Cawnpore and Bánda where survey and settlement operations interfered with the work. The value of the tests is undoubtedly much greater than it used to be, and there is less shirking, but continued pressure is necessary in order to attain a still higher standard ; for this purpose the efforts of the district staff must be relied on, and it is disappointing to have to record once again that so many officers have either neglected the records altogether or have confined their attention to the work of the patwáris. I proceed to indicate the districts where this has been the case.

Testing by superior officers.

25. The amount of testing done by officers on the headquarters staff was inadequate in Bulandshahr, Muttra, Agra, Jhánsi, Pilibhít, Gorakhpur, Lucknow, Unao and Rae Bareli. Sufficient attention was not paid to the khewats and rent-rolls in Bareilly, Budaun, Sháhjahánpur, Sitapur, Kheri and Gonda. The rent-rolls were somewhat neglected in Mirzapur and the khewats in Basti. Special work in connection with the damage done by frost is stated to have been the cause of deficient work in many districts ; heavy case-work is given as an additional reason in the reports from Budaun, Pilibhít and Bareilly ; in Gorakhpur the re-assessment of jungle grants and alluvial maháls, and in Rae Bareli the Salarpur manœuvres interfered with the testing of land records. These reasons are not in all cases adequate : the frost occurred in February when three-fourths of the ordinary camping season was over, and in several districts the deficiency in testing far exceeds one-fourth of a fair amount. The truth, in some cases at least, is that testing was neglected in the early part of the season, doubtless in the hope that it would be done later on, and then the frost came and other work had to give way to the enquiry into its effects.

26. In the districts noted on the margin the time of the headquarters staff was badly distributed, and was devoted more to patwári's work than to retesting that of the supervisors. As the Commissioner of Benares remarks, this deprives the work of sub-divisional officers of most of its value : it is the duty of the headquarters staff to see that proper supervision is being exercised and not to attempt the impossible task of themselves supervising patwáris. I cannot put the case more clearly.

| | |
|---|---|
| Saharanpur. | Gorakhpur, |
| Bulandshahr. | Basti. |
| Muttra, | Lucknow. |
| Agra. | Sitapur. |
| Bareilly, | Kheri, |
| Sháhjahánpur. | Fyzabad, |
| Mirzapur. | Bahraich. |

27. Tahsildárs with the assistance of their naibs have as a rule done an adequate amount of work, but in Aligarh, Bareilly and Sitapur failure to comply with the rules was noticed.

28. The work done by sadr kanúngos is reported in quarterly returns submitted to me and defects are pointed out to them at the time ; the figures therefore need not be discussed here. Two sadr kanúngos, those of Etáwah and Gházipur, were reduced for incompetence ; and some of the older and less competent men have retired or will shortly do so. Mention has been made in the district reports of good work done by the sadr kanúngos of Basti, Allahabad, Fatehpur, Sháhjahánpur, Meerut, Moradabad, Cawnpore, Ballia, Rae Bareli, Gonda and Bara Banki. The sadr kanúngo of Bijnor deserves credit for the great improvement that is noticeable in the record work of that district during the past few years, and I can endorse the commendation of district officers in most, but not in all, cases. On the whole, however, the sadr kanúngos are a much more useful body of officers than was the case a few years ago, and there are now very few who can really be described as inefficient.

29. During the cold weather the land records work in Aligarh, Etáwah and Allahabad was overhauled by Assistant Collectors attached to the department for that purpose. The officers selected were Mr. R. W. D. Willoughby for Aligarh, Mr. D. L. Drake-Brockman for Etáwah, and Mr. J. L. Maffey for Allahabad. Mr. Drake-Brockman's excellent inspections in Etáwah led to the reduction of the sadr kanúngo and the removal of the most incompetent kanúngos. Mr. Maffey did useful work in Allahabad in the short time available before his transfer to another province. Mr. Willoughby's work was characterized by care and thoroughness, and has been of material benefit. The districts of Farukhabad,

Budaun and Gházipur were proposed to be taken up in the present cold weather but owing to the dearth of Assistant Collectors with full powers the Government was able to depute only one officer, Mr. E. M. Nanavutty, who has been posted to Farukhabad.

Maintenance of boundary marks.

30. The inspection and repair of boundary marks appears to have received attention in all districts and the marks are generally reported to be in good order. The rules and orders on this subject were collected and revised, and the introduction of the new rules was sanctioned experimentally in six districts.

Map correction.

31. In most of the Agra districts no difficulty is experienced in keeping the maps up to date. In a few cases where the work of correction is especially heavy owing to fluvial action or fluctuating cultivation, maps were revised by amíns. The condition of the maps in Allahabad is now said to be fairly satisfactory, the correction of those of the trans-Jumna tahsíls having been completed. In Basti the correction of maps in *halbandi* villages presents special difficulties owing to the minute sub-division of fields. Considerable progress was, however, made during the year and the appointment of two additional kanúngos provided in the general scheme will enable closer supervision to be exercised. As regards the maintenance of maps of the alluvial villages in the Ballia district the Board have decided not to undertake a resurvey of the tract : the supervising staff, however, will now be strengthened, and the Collector has been asked to submit proposals for revision of circles in cases where the work is beyond the strength of the existing staff of patwáris.

32. In Oudh the general condition of the maps is reported to be satisfactory in most districts. In Sitapur 809 maps were added to the number (1,184) classed as capable of correction in the ordinary way, and 1,202 maps were brought up to date. The revision of the remainder is being pushed on. The Deputy Commissioner of Hardoi reports that the maps of all villages in the district have been corrected except in those cases where they are so hopelessly out of date that special action is necessary. Measures have been started by which the remaining maps, 811 in all, will be completed during the next two years. In Kheri the attention given to the subject by the Deputy Commissioner has produced good results and the maps of 1,307 out of 1,739 villages were fully corrected. A grant of Rs. 250 has been made to facilitate completion of the work. As regards Bara Banki it was found that the maps in pargana Bhitauli could not be revised in the manner adopted in Sitapur and a report on the subject was submitted to the Board. It has now been decided that a resurvey by professional agency is necessary and this will be carried out next season.

Concealment of rents.

33. Cases of concealment are reported from 14 districts, being most numerous in Basti, Gorakhpur and Agra. In the Kasia sub-division of Gorakhpur considerable progress was made in getting the real assets recorded and the rent-rolls of nearly 500 villages were verified. Little has been done in the remainder of the district, where the rent-rolls are stated to be antiquated.

34. Special attention was paid to the rent-rolls in Basti. The kanúngos in this district are now working honestly and with the increased power obtained by the system of personal pay the patwáris are gradually coming under control and realizing that they are the servants of Government rather than of the landholders. Great progress has been made in getting accurate rent-rolls and in expunging the fictitious entries of tenure that have so long existed, and much credit is due to Mr. Morgan, the Collector, for his efforts ; at the same time it must be recognised that a continuance of steady pressure is essential to put the records on a really sound footing.

Preparation and maintenance of tahsíl registers.

35. The new registers of Gházipur and Jaunpur were completed by my special staff, which has now been moved to Allahabad and Ballia. Registers for Cawnpore, Jalaun, Azamgarh and Mainpuri are being prepared in the settlement offices and a special staff is engaged on the registers of Agra. The forms of fresh registers for *zamindári* and *mustajri* villages in Naini Tal have been settled, and the forms for *khám* villages are under consideration.

36. All the pargana hand-books of Etah were published during the year and hand-books of Mainpuri were completed and sent to press.

Director's inspections.

37. The inspections made by me, and by Mr. Oppenheim on my behalf, have been indicated in an earlier chapter. They have gone to confirm what I said last year regarding the need for increased attention to the khatauni and the jamabandi : the former record in particular, though it is the legal record of all cultivating rights, is undoubtedly less accurate than the khasra from which it is compiled. I hope during the present year to submit proposals with a view to securing improvement in this matter. In Oudh my attention was called afresh to the inconveniences resulting from the want of an adequate record of *sír* rights, and my final proposals on this difficult question will soon be forwarded to the Board of Revenue.

38. The value of the work done by my inspectors has, I think, been greater than in any previous year within my experience, and their efforts have been of material assistance to district officers in bringing to light defects in routine, and occasionally in organization.

Amendment of rules.

39. Several minor changes were made in the rules for patwáris and kanúngos, etc., which do not call for special notice. The only important change was the alteration in the form of the Agra khatauni and certain consequential amendments, designed to show the rent actually demanded as contrasted with the legal rent of the holding. Revised rules for kanúngos and patwáris in the Bhábar were sanctioned and issued during the year.

State of the patwári funds.

40. The surplus for the year amounted to Rs. 1,84,022 and the sum at the credit of the fund rose from Rs. 6,60,859 to Rs. 8,44,881. As already mentioned, proposals for utilizing the recurring surplus have just received sanction.

## (II).—Surveys and revision of records.

41. One traverse section, three cadastral sections and the drawing office were at work during the year. The outturn accomplished has been 200 linear miles and 167 square miles of topographical survey on the 2″ scale, 323 square miles of traverse survey for cadastral purposes, 349 square miles of new cadastral survey, and 1,823 square miles of revision of cadastral maps, and in addition certain minor surveys which are mentioned in detail below.

Traverse section.

42. (*Mr. F. S. Bell in charge*).—An area of 323·2 square miles, included in the riverain tracts of Moradabad district along the Ganges, was traversed. The main circuits had already been measured in 1903-1904, and the 16″ skeleton plots of all villages were made over to the district cadastral section by the end of January. The cost of the work including a share of the headquarter charges of the provincial surveys was Rs. 8,416 and the cost-rate Rs. 26 per square mile. Traverse connections were made with five great trigonometrical stations, and the average error per mile in feet works out to 4·6 or 0·87 per *mille*. Azimuth observations were taken at 48 points, the angular error disclosed being 3″·2 per angle. The preliminary demarcation by the district authorities had been well done.

43. A traverse was also run along the Allahabad-Rewah boundary in order to fix the sites of the boundary pillars and with a view to the cadastral survey of a strip of ground along the boundary next season by the land records department. The length of the traverse was 98 miles, and the cost-rate Rs. 9·7 per linear mile. The work was difficult and rather expensive, as the line runs over and along a low range of hills for a considerable portion of its length. Fifty-two azimuth observations were taken, the mean angular error being 2″·6 per angle.

44. The traverse section also revised the 64″ plans of 8·4 square miles of Cawnpore city and environs, brought up to date the cadastral maps of certain estates including an area of 1·7 square miles in Cawnpore for the settlement department, surveyed and mapped, on the scale of 24″ to the mile, 1·6 square miles of the lands of the Hapur Remount depôt, prepared general maps on the 16″ scale of Fyzabad and Ajodhya towns, from the recent surveys of those municipalities, and surveyed on the 64″ scale the boundaries of 1,364 linear miles of first class roads for the Public Works Department.

45. *Moradabad cadastral section* (*Mr. L. F. Berkeley, in charge*).—The programme of cadastral survey and revision in Moradabad district was almost completed by the end of the year. Operations were commenced in October 1903, and have included the resurvey of 860 square miles in tahsíls Moradabad, Thakurdwara, Amroha, Hasanpur and Sambhal, and the revision of maps in the last three tahsíls. The total expenditure from the beginning up to October 1st, 1905, is Rs. 76,185, the cost-rate for the district being Rs. 37 for survey and revision, and Rs. 22 for record-writing. The district had been traversed and cadastrally surveyed in the years 1871—76 but in the riverain tracts the old traverse stations had disappeared and fresh traverse was necessary. During the year, maps and records of 807 villages with an area of 669 square miles in Amroha, Hasanpur and Sambhal have been prepared. Of this area 349 square miles was resurveyed and in 320 square miles, the old maps were corrected, the cost-rates being Rs. 38·0 per square mile for survey and map-correction and Rs. 17 per square mile for record-writing, or if a share of the head-quarter charges of the provincial surveys are included Rs. 40·4 and Rs. 17·9 respectively. The maps were checked by an average of 4·4 linear miles of test survey per square mile, including 1·75 linear miles per square mile, run by officers and independently. Of the 185 patwáris trained, 43 failed to qualify ; 29 of these provided their heirs to do the work and substitutes had to be provided for 14 only.

46. *Bánda cadastral section* (*Mr. F. B. Powell, in charge*).—Cadastral operations began in this district in October 1903, and will be completed in November 1907. Up to date the maps in tahsíls Bánda, Pailani, Baberu and Kamasin have been revised and those of Girwan, Badausa, Mau and Karwi remain to be revised during the next two years. The areas in which the maps have been revised and new annual records written during the year are 362 square miles in tahsíl Baberu and 358 square miles in tahsíl Kamasin, total 720 square miles, the cost-rates being Rs. 23·6 for survey work and Rs. 15 for record-writing, or if a share of the headquarter charges are included Rs. 26 and Rs. 17 respectively. Owing to the serious interruptions caused by the necessity for withdrawing the patwáris from survey duty in order to estimate the damage done to the crops by the cold of January, February and March, the whole of the village records for the year cannot be completed and made over to the Settlement Officer for some months to come, but the arrears will not be so serious as to delay settlement work. The traverse stations of the survey of 1874—77 were permanently marked by stones and are still available. An average of 4·3 linear miles of test survey was applied per square mile, including 1·5 linear miles per square mile run by officers and independently. Of 184 patwáris trained 17 failed to qualify ; 7 of these provided their heirs to do the work, and substitutes had to be provided for the other 10. Mr. J. B. Smart, Deputy Collector, was attached to this section in February and has been trained in all branches of the work in order that he may take the place of Babu Nilmoni Chatterji, the assistant survey officer, who was transferred to Bengal in October.

47. *Hamírpur Cadastral section* (*Mr. P. C. Smart, in charge*).—The revision of the cadastral maps of Hamírpur was commenced in October 1903, and operations will close in November 1906. Up to date parganas Hamírpur, Sumerpur Maudaha, Rath, Jalalpur and Muskara have been dealt with, and Mahoba tahsíl remains for 1905-1906. During the year the maps of parganas Rath, Jalalpur and Muskara, including an area of 782 square miles, have been corrected, and annual records have been written for the same area. The cost-rates for the year are Rs. 27·7 per square mile for map correction and Rs. 18·8 per square mile for record-writing, or if a share of the headquarter charges are included, Rs. 30 and Rs. 20 respectively. The patwáris were withdrawn from survey work for considerable periods at different times to estimate the damage done to crops by cold, and for attendance at the special judge's court at Hamírpur ; 158 summonses involving each an average absence of 15 days were received on the latter account alone. Owing to these causes field work did not close till August and although a number of records will be ready in November or December the whole of the records cannot be completed till February. The maps have been checked by an average of 4·5 linear miles of test survey per square mile, of which 1·7 linear miles per square mile were run by officers or independently. The traverse stations of the last survey of 1874—79 were not permanently marked,

and except those at tri-junctions of village boundaries, very few have been found ; this has enhanced the difficulty of the work and will render map maintenance in future very arduous. Thirty-three out of 195 patwáris failed to qualify in survey ; 19 of these provided their heirs to do the work, and local substitutes had to be provided for 14. Thakur Lekhraj Singh, Deputy Collector, was attached to the section in February and has been trained with a view to his taking the place of Mr. Littlewood, assistant Survey Officer, who was transferred in October.

Drawing office.

48. In the Drawing Office fourteen standard sheets have been compiled in 50 sections on the 2″ scale for reduction, from the cadastral maps of modern surveys of Bahraich, Kheri, Etah and Mainpuri. Twenty-one of the old 2″ fair sheets of the topographical survey of Meerut dated 1878 to 1882 have been revised from the modern cadastral maps. Two district maps and 16 traverse charts have been drawn and 22 plane-table sections for supplementary survey on the 2″ scale have been compiled from the cadastral maps of Farukhabad, Etáwah and Jalaun. The office is organised in two sections, Mr. Price, a retired officer of the Department, having been specially re-employed to supervise the work of the smaller section which deals with the arrears of mapping. In order to supplement and fill in gaps in the cadastral material used, one sub-surveyor and two probationary sub-surveyors were employed on the topographical survey of certain roads and railways in districts of Meerut, Sitapur and Bahraich and of the riverain areas along the Ghogra in Bahraich, Kheri and Sitapur. The probationers were not sufficiently trained for independent work till nearly the close of the season, and the total outturn was 167 square miles and 201 linear miles.

49. The provincial surveys ceased to exist as a separate organization in October, the drawing office alone being retained for another year to continue the compilation of preliminary editions of standard sheets from cadastral maps. The cadastral map correction remaining to be done in Bánda and Hamírpur, and the miscellaneous work of the traverse section has been transferred to the direct supervision and control of the land records department, which has been strengthened by the appointment of Mr. T. F. Freeman, a survey officer of wide experience, as Deputy Director for surveys.

50. No enquiries were made this year from settlement officers as to the quality of maps and records, because the settlement officers recently appointed have not had time to make themselves acquainted with the papers prepared. The following tabular statement of cadastral operations is given in accordance with the correspondence ending with Government order No. 1701/I-407/1904, dated 23rd June 1904.

| District. | Date of commencement of cadastral operations. | Work done during the year. | Expenditure during the year. | Cost rates per square mile of the year. | | Remaining for future years. |
|---|---|---|---|---|---|---|
| | | | | Survey. | Record-writing. | |
| | | | Rs. | Rs. a. p. | Rs. a. p | |
| Moradabad | 1st October 1903. | 1903-4—593·8 sq. miles ... | 34,056 | 43 0 0 | 16 1 0 | |
| | | 1904-5—Survey 349·2 sq. m.<br>Revision 319·8 „<br>Records 894·4 „ | (b) 40,712 | (a) 38 0 0 | (a) 17 0 0 | District completed. |
| Bánda ... | 1st October 1903. | 1903-4—789 sq. miles ... | 28,960 | 27 5 0 | 9 2 0 | 1905-6, 666 sq. miles. |
| | | 1904-5—Revision and Records 720 „ | 29,299 | (a) 23 9 7 | (a) 15 0 0 | 1906-7, 884. „ |
| Hamirpur | 1st October 1903. | 1903-4—613 sq. miles ... | 30,054 | 36 8 0 | 12 2 0 | 1905-6, 888 „ |
| | | 1904-5—Revision and Records 782 „ | 36,454 | (a) 27 11 2 | (a) 18 12 9 | |

(a) The rates are approximate.

(b) Excludes expenditure incurred on work outside the programme.

## CHAPTER III.

### ARBORICULTURE.

Summary of work done.

51. There was no change in the system of control and management of arboricultural operations. The manual of arboriculture was issued during the year and has been of service to many district officers in drawing up working-plans. Two hundred and thirty four miles of road were planted with trees during the year and 238 miles were added to the avenues classed as established and requiring no regular protection. On the other hand 148 miles of roads erroneously classed as having avenues were struck off on revision. Damage done by frost accounts to some extent for the exclusions, 29 miles in Bulandshahr alone being struck off on this account but in Farukhabad 69 miles and in Bareilly 30 miles were excluded from the established avenues on the ground of the existence of large gaps.

52. The total length of roads without avenues established or under operations in the provinces is about 19,700 miles. Under the orders of Government the unplanted lengths are being located and a report will be submitted when the enquiries are completed showing how many of these miles can be usefully planted; it will probably be found that a very large proportion is too narrow for avenues.

53. Unsuitable trees were planted in only a few cases. In passing the new working-plans special attention is being paid to the selection of suitable trees for fresh planting, and I believe that the plans now being passed will secure good work if they are carefully carried out. But there are several districts in which the funds allotted to arboriculture are small, although the length of unplanted roads is very large; the question of funds will be taken up when the enquiries referred to in the preceding paragraph are complete.

Maintenance of working-plans.

54. Working-plans were adhered to in most districts. In one case the plan was found to be defective; in five divergence during the year resulted from divergence in previous years; in six cases funds were diverted to gap filling and maintenance, so that no new planting was done; the weather interfered with planting in two districts; defective administration was responsible for failure in one, and individual caprice in two cases. The damage done to young trees by the exceptional frost was severe in many districts and in some cases the working-plans will have to be revised in consequence.

55. Supervisors of arboriculture are entertained in a few districts and arrangements were made at Lucknow to put these supervisors through a course of training. A class was opened at the Horticultural Garden in July 1905 which was joined by candidates from eight districts. The question of the best arrangements for training supervisors is now before Government.

Financial results.

56. The expenditure on provincial roads was Rs. 28,481 and the receipts Rs. 43,045 leaving a surplus of Rs. 14,564. The income was made up as follows:—Sale of trees cut down Rs. (9,112), sale of fallen trees (Rs. 5,843), loppings (Rs. 1,333), grass (Rs. 18,663), other annual produce and miscellaneous (Rs. 8,094). Although the surplus was Rs. 5,000 less than in the preceding year, the income from all sources except fallen trees and lopping was higher. The loss of trees caused by storms had been very high in 1903-4, and a decrease in the income derived from fallen trees is a matter for congratulation.

57. The expenditure on local roads rose from Rs. 73,953 to Rs. 75,987. The receipts however fell from Rs. 84,352 to Rs. 74,801 and a surplus of Rs. 10,399 was turned into a deficit of Rs. 1,186. The hill districts and Bundelkhand have little or no recurring income and show a deficit each year. Other districts in which the expenditure was considerably in excess of the income are Muttra, Jaunpur, Gházipur in Agra and Rae Bareli, Sitapur, Sultánpur and Partábgarh in Oudh. Of these Gházipur, Sitapur, Sultánpur and Partábgarh had practically no income from fallen trees, and in the others the recurring income was small.

## CHAPTER IV.

### ASSISTANCE GIVEN TO THE PUBLIC.

Distribution of implements.

58. The demand for the implements supplied by the department has been normal and calls for few remarks. The number of iron ploughs issued was practically unchanged, but a larger proportion consisted of the most expensive and efficient tillage-implement offered, the Watts' chain plough.

Distribution of seed.

59. The sales of seed for cash increased considerably during the year, the total issued from Cawnpore amounting to 665 maunds of 28 kinds against 443 maunds in the previous years. More could have been sold had it been available, but the supply on hand was inadequate to meet the demand in full. In addition to the quantity mentioned above, 750 maunds of Muzaffarnagar wheat were supplied for seed to the Khedivial agricultural society of Egypt: it is a striking fact that this wheat with a habitat of limited area should be in demand at the same time in Egypt and in Bihar.

60. The issues of seed on credit reached a total of 5,682 maunds, or nearly 1,300 maunds in excess of the previous year's distribution. For the first time since this work was started it has not been possible to recover the advances completely at harvest; the cause of the failure is to be found in the exceptional frost which ruined the wheat and other crops over so much of Oudh; I have had to postpone realization of relatively large quantities of seed, and much of what was paid in was so poor as to be unfit for re-issue. At the same time, the demand for seed for the current rabi was unprecedented; even cultivators who usually save their own seed had nothing to sow, and the seed-grain offered in the local markets was often unspeakably bad. In these circumstances it was necessary to import large stocks into the area covered by our operations, and the ordinary funds have been supplemented by fresh advances from Government aggregating Rs. 8,000. The purchase of so much seed at a time when prices are high will probably result in the depletion of the reserve-fund accumulated in the last few years; but the main object of the reserve-fund was to meet emergencies of this nature, and it has been well spent in mitigating, so far as our resources allowed, the after-effects of last year's great calamity.

61. I referred last year to the organization of co-operative seed societies as the most desirable development of these operations. Some societies have now been organized by the Registrar, but as it was obviously unwise for them to begin by buying their stock at abnormally high prices, I have agreed for the present to advance seed in bulk to these societies on about the usual terms, so that they will gain experience of methods of working together while waiting for a favourable time to acquire their own stock of grain. Independently of these societies, groups of cultivators have been organized by my staff in several villages who will be jointly and severally responsible for the seed issued to them in bulk: these groups may or may not develop into co-operative societies, but in any case they will secure one great advantage, the reduction in the number of individual accounts that have to be maintained when each cultivator is responsible for a small quantity of seed.

Distribution of cotton seed.

62. The small quantity of acclimatized American seed available was distributed without difficulty and several applications had to be refused. My present intention is to confine the issue of our stock to two localities, Cawnpore and Aligarh, in each of which we shall be able to watch the progress of the crop and to assist cultivators when necessary in getting a fair price for the produce, almost an impossibility for small growers dependent on their own resources.

63. The enquiries made during the year elicited the fact that there are very few localities in the provinces where any good can be done by distributing seed of the indigenous variety: stocks of seed have been laid in to provide for the localities where the need has been ascertained to exist. I need not refer to this matter at greater length as it forms the subject of a report which I have recently submitted to Government.

64. The staff of borers has been fully occupied, and the number of trial borings completed during the year (263) is the largest hitherto attained. The well-expert has given advice in 96 cases of difficulty, but much of his time has been occupied in testing new tools and other departmental work. As has been indicated in a previous chapter, a large development of these operations is contemplated. What may be termed a 'well-survey' is being conducted by the land record staff, which will collect (among other information) the facts regarding every village in the provinces where difficulties in well-sinking prevent the adequate protection of the crops: these villages will be taken up in order and examined with a view to determining, and where possible overcoming, the difficulties that exist.

Well-sinking and allied subjects.

65. The great need is for more efficient tools. Mr. Martin's borer, referred to in last year's report, has been under prolonged trial: some alterations in it have been devised to obviate the defects found in its practical working, and a final decision as to its value will soon be made. In dealing with this tool I have received much assistance from Mr. E. A. Molony, I.C.S., who spent part of his leave in studying the methods of boring practised in England: since the close of the year Mr. Molony has been placed on special duty to dispose of this and other pending questions that must be settled before practical operations can be extended.

66. Reference was made last year to the improvement of the drinking water in the tarai. The first set of analyses reached me during the year, and showed most satisfactory results: in every case but one where a well has been treated on the methods indicated by the well-expert, the new supply of water was found to be potable *by European standards*, while in the single exception the water, though slightly below those standards, was described as 'probably better than is drunk by half the people in the plains. On the other hand where the wells had merely been cleaned out analysis showed little or no improvement in the quality of the water, thus establishing the fact that the contamination is outside the well.

67. Until recently the staff of the civil veterinary department has been so fully occupied in other matters that questions of cattle-breeding have been dealt with by the agricultural staff, and therefore the results have been noticed in this report. This course is no longer necessary, and the subject will in future be dealt with in the report of the Civil Veterinary Department.

Cattle breeding.

## CHAPTER V.

### Supply of information.

68. The following bulletins were issued during the year under report:—

Publications.

(1) Bulletin No. 19 on "Improvements in native methods of sugar manufacture."

(2) Bulletin No. 20 on "A method of improving the drinking water in the tarai."

The first of these explains the results of the experiments made by the Assistant Director during the past few years; the second, the improvements of the water supply in the tarai referred to in the preceding chapter. Both of these bulletins have attracted so much attention that it has been decided to issue translations.

69. The first series of notes on the agricultural capacities and defects of the districts of the provinces was practically completed during the year, and a summary of them was prepared entitled "The agricultural defects of the United Provinces;" it is rather too technical for publication, but copies have been distributed to officers to whom they will be useful. The issue of the Manual of Arboriculture has already been referred to.

70. The circulation of the journal, published in Urdu, rose to 778 copies at the close of the year, an increase of 118 on the circulation reported a year ago. I have considered the question of reviving the Hindi edition of the journal which lapsed some years ago for want of subscribers: the great majority of the unofficial correspondents of the department however considered that the effective demand would be trifling, and I decided to postpone this enterprise until our local organization has advanced further.

Agricultural journal.

71. The number of unofficial correspondents increased very largely during the year: there were in all 1,711 as against 1,027 in 1903-1904, and there is every probability that as agricultural stations are multiplied the number of correspondents will rise steadily. The subjects covered by the enquiries were as varied as ever, but among them were an exceptional number referring to sugar-manufacture, a healthy sign.

Summary of correspondence.

## CHAPTER VI.

### Associations, shows and demonstrations.

72. No meeting of Court of Wards managers was held during the year; but I conferred at various times with the managers of several districts, and assisted them in drawing up programmes of improvements suitable to the needs of the estates under their control.

Meetings of Court of Wards managers.

73. There are nominally three associations in the Provinces, the Porter Association of the Allahabad district, and the associations at Bijnor and Sultánpur. No meetings for business purposes were held by any of them during the year; but Rai Mahabir Prasad Narain Singh Bahadur, the energetic secretary of the Porter Association, has continued his efforts for the assistance of his neighbours.

Associations.

74. Agricultural shows were held during the year at Parsehri (Sitapur), Kakora (Budaun), Aligarh, Muzaffarnagar, Meerut, Bulandshahr and Sultánpur. The last named show was managed mainly by the Assistant Director, the remainder were attended by the executive officials of the Department. The Sultánpur show was rather a failure: the people were much depressed by the frost which had just ruined their crops, while plague was prevalent in the district, and owing to these two causes the attendance was very poor. I was present at the show and handed the Deputy Commissioner a note indicating certain lines in which I considered the show might be made more successful if it were decided to continue it. The Parsehri show was organized by the Manager of the Court of Wards estates in Sitapur, who displayed a very keen interest in it and gave every facility to his tenants to see improved implements and methods. The other shows are for the most well-established amusements, and there is nothing distinctive to note regarding the agricultural features of any of them.

Agricultural shows.

75. Five cattle shows were arranged for with the funds provided by the Government of India. Of these one (at Karma) was abandoned owing to plague: three (Bahraich, Gonda and Lakhimpur) failed to attract adequate exhibits by breeders, and only the fifth (that at Karwi) can be called a success. It was decided during the year to organize more and smaller shows to be held in the breeding tracts themselves; I am not yet in a position to say how this change will work, but there is no doubt that the original locations (which were selected on the advice of the Commissioners), were too far from the breeding tracts to be successful.

Cattle shows.

76. It has been decided to discontinue the grants from provincial funds for prizes for cattle at the agricultural shows at Aligarh and Meerut, as prolonged experience has shown that they have had no effect in encouraging breeding in these tracts.

77. The work of this farm continued during the year. It would almost have paid its way but for the damage by the frost to certain special crops from which a large income was reasonably hoped for. The farm is still too large for its purpose, its situation is unfavourable, and it is no longer needed under the new scheme for the department; it has therefore been decided to close it, and to restore the land to the owners from whom it is held. This decision was accelerated by the fact that some of the landholders have served notices of ejectment which we have no grounds for contesting.

Meerut demonstration farm.

78. Kuar Karan Singh maintains the useful farm at Jatau in the Agra district; in addition to the farm he has established a small veterinary dispensary, an example that might be widely followed with great advantage to the country. A gentleman named Maulvi Muhammad Mahmud has developed a small farm at Thana Bhawan in Muzaffarnagar, and has demonstrated various novelties with the assistance of the department.

Private demonstration farms.

79. A small beginning has been made in the less formal demonstrations which will in the future be one of the chief features in the work of the department. Plots of Muzaffarnagar wheat were grown in competition with the local varieties at certain places in the Sultánpur district, and the actual outturns were determined and compared in the presence of cultivators; the superiority of the Muzaffarnagar variety displayed itself in the trials, which were appreciated by the people.

80. The working of the sugar factory was exhibited at Cawnpore, Sultánpur and Rampur, the latter locality being chosen for the principal demonstrations because of the facility with which cane could be procured in large quantities. As a result of these demonstrations the Rámpur State is importing machinery with a view to adopt our processes on a considerable scale, while machinery is being procured by the department for three landholders who have decided to start small factories on the lines of that worked by the Assistant Director, and several applications have been received from persons wishing to learn the processes.

The sugar factory.

## CHAPTER VII.

### Agricultural Education.

81. The agricultural school had a very trying year. There were repeated outbreaks of plague in the neighbourhood; the premises were infected more than once, and though the staff and students fortunately escaped, some deaths occurred among the servants of the institution. Eventually I decided (on the advice of the Civil Surgeon) to close the school for the session after the mid-term examination, which was accepted as the final test. The class that passed out in 1905 numbered 36 in all; the 1904 class contains 28 students, while the 1905 class comprises 46, by far the largest number since the opening of the school.

The agricultural school.

82. The staff of the school has been much improved; teachers of botany and chemistry, in each case with special agricultural training, joined the school in July, and are working satisfactorily. The various out-door institutions continue to work efficiently; and the establishment of the school farm has added very largely to the facilities for bringing home to both staff and students the practical, money-making, side of agriculture.

83. A third boarding house was built during the year: the remaining projects for improving the buildings (referred to in last year's report), have been dropped in view of the decision to develop the school into a college, as it will be more satisfactory in all respects to build a separate college and utilize the existing school building (which is quite unsuitable for teaching) in some other way.

84. The health and conduct of the students have been satisfactory; year by year the class of students improves in quality, and they now present material as satisfactory as can be looked for pending improvement in the general education of the provinces. For our purposes we should of course prefer to recruit more students with an elementary conception, I will not say of science, but of the fact that eyes can be used for other purposes than reading. The training of the eye takes an excessive proportion of the two years' course of the school, and the third year of the college course will be of particular advantage in this respect.

85. The department has not been concerned with other educational questions during the year, beyond reporting on certain applications received for scholarships for industrial training. One of these applications has been rejected; orders on the remaining two are awaited.

Other educational questions.

# ORDERS OF GOVERNMENT.

No. $\frac{1056}{\text{I}-243}$ OF 1906.

## RESOLUTION.

REVENUE DEPARTMENT.

*Dated Allahabad, the 29th March* 1906.

READ—

Letter no. $\frac{635}{\text{VIII}-596}$, dated the 22nd January 1906, from the Director of land records and agriculture, United Provinces, being his report on the operations of the department of land records and agriculture for the year ending 30th September 1905.

Read also—

Letter no. $\frac{49}{\text{VII}-47(3)}$, dated the 15th February 1906, from the Board of Revenue, United Provinces, forwarding the report with remarks.

OBSERVATIONS.—The report of the Director of land records and agriculture for the year 1904-5 accentuates the remark made in the resolution reviewing the report for the previous year that his department differed from all others in the province in its capacity for expansion. With the large increase in the funds placed at his disposal by the generosity of the Government of India, the Director has embarked on developments of the agricultural department which are full of promise of benefits to the tillers of the soil who form the great bulk of the population. Arrangements have been made for scientific inquiry at Cawnpore into agricultural problems that specially concern this province, and the present agricultural school is being converted into a college with a three years' course : it will be provided with laboratories, and scientists trained in England will be appointed to the staff. Although the buildings will not be completed, it is proposed to start the college classes this hot weather.

2. Next in importance to the foundation of the college, but of more immediate interest to the general public, as it will bring the cultivator into closer contact with the department, is the establishment, throughout the province, of agricultural stations, with experimental farms, where seed most suited to the locality will be raised for local distribution, local difficulties investigated, and the value of ascertained improvements demonstrated ; where the tenant or the landholder in difficulty can apply for advice whether in the matter of fighting disease which has attacked his crop or in sinking a well ; and where he can see and borrow or purchase improved agricultural implements. The number of these centres can only be increased from time to time as the college educates the men who eventually will take charge of them, but the Cawnpore farm is in existence, that at Orai began work in June last, and two others at Partabgarh and Aligarh will shortly be in working order.

The public demand for a trained well-sinking staff is established ; the subject has formed the subject of inquiry by an officer specially deputed for the purpose and a special equipment has been devised : the organization is nearly complete, and the cultivator throughout the country will shortly have at his call, and within an easy journey, experts who will

assist him and save him from what in the past has often proved unprofitable expenditure. As a safeguard against famine this part of the scheme is far from being the least important.

3. In the intervals of his other multifarious duties the Director has prepared and issued a Manual of Arboriculture, full of useful advice, which, it is hoped, will assist the district officer in bringing more system and economy into his operations; arboriculture, both on local and provincial roads, is at present the subject of further inquiry; roads deficient in avenues are being localized; and unusual variations in income and expenditure are being investigated. When the reports of the inquiry are received, the necessity for an additional allotment of funds to particular districts will be considered.

4. The improvement of the native sugar factory has for several years taken up much of the time of the Assistant Director and his demonstrations have excited interest throughout the country. Saiyid Muhammad Hadi is also responsible for much of the success that has attended the establishment of seed dépôts in the south of Oudh. After the destruction of the crops by the frost last year the demand for seed has been unprecedented, and the facilities offered to the cultivator at these dépôts by bringing good seed within his reach at a moderate price or on credit when he could not pay for it have been of incalculable value. Dépôts similar to those in Oudh will be attached to each of the agricultural stations, but it is hoped that the demonstrated success already obtained will result in the establishment of seed dépôts throughout the country by the people themselves on a co-operative basis. A start has been made in the Amethi tahsil of the Sultanpur district, where twelve societies have been registered whose members have jointly taken advances from the government seed dépôt at Amethi. The next step will be for these societies to purchase or collect their own seed at harvest time and start their own co-operative seed stores.

5. That the department is getting more and more in touch with the people is shown by the demand for copies of the two bulletins issued during the year, the one on "Improvements in native methods of sugar manufacture" and the other on "A method of improving the drinking water of the Tarai," by the increasing numbers of subscriptions to the agricultural journal, and the great increase in the number of unofficial correspondents.

6. So closely connected with agriculture is the financing of the agriculturists that, though it forms the subject of a separate report, some mention must be made here of the steps that have been taken to establish co-operative credit societies. During the year a registrar was appointed, his time being, in the first instance, occupied in visiting the existing banks, putting them on a legal basis and framing rules. Since then 350 societies have been registered; of these the majority are small village or caste societies doing business with central or urban banks. The capital at the disposal of these societies already amounts to Rs. 2,67,000. A fair start has been made, and though it is too early to speak of success, it may be said that the prospects in general appear good and in some directions excellent.

7. Less interesting, but not less important, are the operations of the land record department, and here too much progress has been reported. In anticipation of the sanction of the Secretary of State to the appointment of a Deputy Director the officer selected for the appointment has been placed on special duty in the department. His time will be entirely devoted to the supervision of the land records staff and their work.

At an annual cost of Rs. 43,500 the staff of kanungos has been increased by adding 43 to the number of supervising kanungos, and 4 to the number of sadr kanungos, whose pay has also been improved. The minimum pay of patwaris has been raised in Agra from Rs. 7 to Rs. 8 and that of assistants from Rs. 5 to Rs. 6; at the same time their numbers have been increased. The annual cost involved in these changes amounts to Rs. 91,000.

The staff of assistant registrar kanungos has also been redistributed and their pay raised to Rs. 20 per mensem.

8. The Director reports a further improvement in the percentage of patwaris who have passed their examinations, and that the obligation of residence is becoming more and more of a reality, but the Lieutenant Governor notices with regret that in no fewer than 20 districts, excluding those under settlement, the amount of testing done by officers on the headquarter staff was either insufficient or misapplied. It has frequently been pointed out that for the headquarter staff to supervise the work of patwaris is an impossible task; this must be left to the kanungo establishment, and it is on the sufficiency and accuracy of their inspections that superior officers must concentrate their attention. It is the duty of the collector to satisfy himself that his assistants understand what is required of them in this respect.

The Lieutenant Governor learns with satisfaction of the progress made in revising the village records of the Basti district, and that a start has been made in revising the rent-rolls of the Gorakhpur district where they are said to be antiquated.

9. Finally, the report is an interesting record of progress in many directions; the preparation and introduction of the agricultural scheme has involved heavy labour, and the Lieutenant Governor desires to place on record his high appreciation of the energy and ability shown by Mr. Moreland in the administration of his department.

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ORDER.—Ordered that a copy of this Resolution be forwarded to the Director of land records and agriculture, United Provinces, for information.

Ordered also that a copy of this Resolution be forwarded to the Secretary to the Board of Revenue, United Provinces, for the information of the Board.

Ordered also that a copy of this Resolution be published in the *United Provinces Government Gazette* for general information.

E. F. L. WINTER,

*Chief Secy. to Govt., United Provinces.*

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on 01 February, 2020